All-Hazard Consequence Management Planning for the Water Sector

Preparedness, Emergency Response, and Recovery CIPAC Workgroup

November 2009

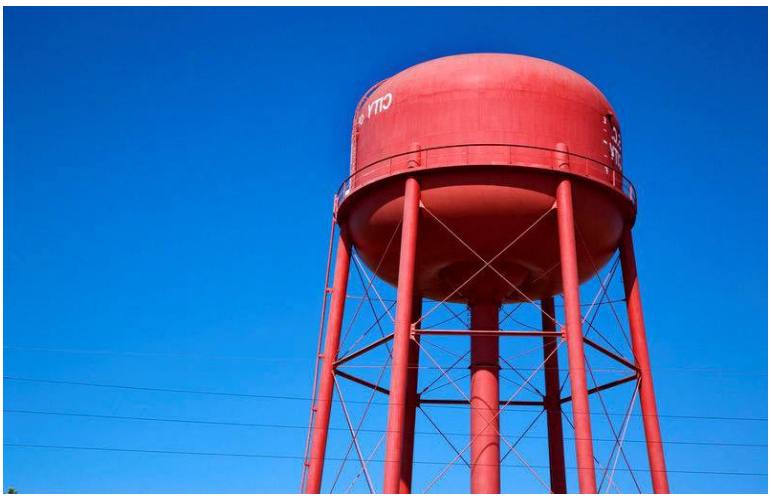

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Table of Contents

Organization

The document is organized into five sections:

Section I provides background and context information.

Section II lists hazards and consequences for drinking water and wastewater utilities to consider.

Section III provides a checklist of actions utilities can undertake to improve their preparedness, response, and recovery for all hazards and consequences.

Section IV is a set of consequence-specific checklists that highlight key preparedness, response, and recovery actions for seven specific consequences of particular concern to utilities.

Section V is an example scenario that shows how hazards and consequences relate and illustrates how coordination with community emergency response organizations and other preparedness and response and recovery planning can improve a utility's responses and make it more resilient.

Appendix 1 is a bibliography of all references.

Section I: Purpose, Organization, and Context

Purpose

The purpose of this document is to provide drinking water and wastewater utilities with planning recommendations derived from emergency management, mitigation planning, and emergency response resources. The goal is to help drinking water and wastewater utilities incorporate all-hazard consequence management concepts into their existing emergency preparedness, response, and recovery planning. This document provides:

- Customizable lists of preparedness, response, and recovery actions that will improve resiliency across all hazards.
- Consequence-specific lists of actions for potential hazards that are most relevant to utilities.
- Information on how the National Incident Management System (NIMS) and the Incident Command System (ICS) are used in preparedness and during response and recovery.

This document is not intended to replace any existing guidance or provide a comprehensive set of preparedness, response, and recovery actions for each and every utility. Detailed guidance documents on specific aspects of preparedness, response, and recovery planning already exist for critical infrastructure sectors, including the water sector. Where possible, those more detailed guidance and resource documents are referenced throughout this document and provided as a bibliography in Appendix 1.

How should utilities use this document?

Utilities should use this document to help expand and improve their existing preparedness, response, and recovery plans and protocols. If a utility already has an Emergency Response Plan (ERP), the action guidelines in this document incorporate all-hazards concepts and may be used to validate the actions and assess the effectiveness of an existing plan. If a utility has not yet developed an Emergency Response Plan, the action guidelines will help them start the process.

What is the relationship between consequence management planning and existing Emergency Response Plans?

Consequence management planning complements a utility's overall emergency preparedness, recovery, and response planning. Most Emergency Response Plans describe specific actions to be taken in response to specific incidents that can affect a utility, such as tornados, hurricanes, or earthquakes. All-hazard consequence management planning does not focus on the types of incidents that may cause problems; it focuses on addressing the problems (or consequences), such as loss of power.

How does consequence management planning make a utility more resilient?

All-hazard consequence management makes utilities more resilient because it helps to identify specific actions that will eliminate or mitigate consequences associated with specific problems, regardless of the cause. Consequence management planning is driven by the fact that during a crisis or emergency it is more important to address the problem than to spend time and resources identifying the cause of the problem. For example, during a service outage, it is more important to restore power which returns service to the customers than to spend valuable resources looking for the underlying cause of the outage (at that moment). More importantly, effective planning allows a utility to mitigate the negative impacts associated with a service outage by taking steps to minimize the impacts and implement planning responses (actions) that result in a quick resolution to the problem.

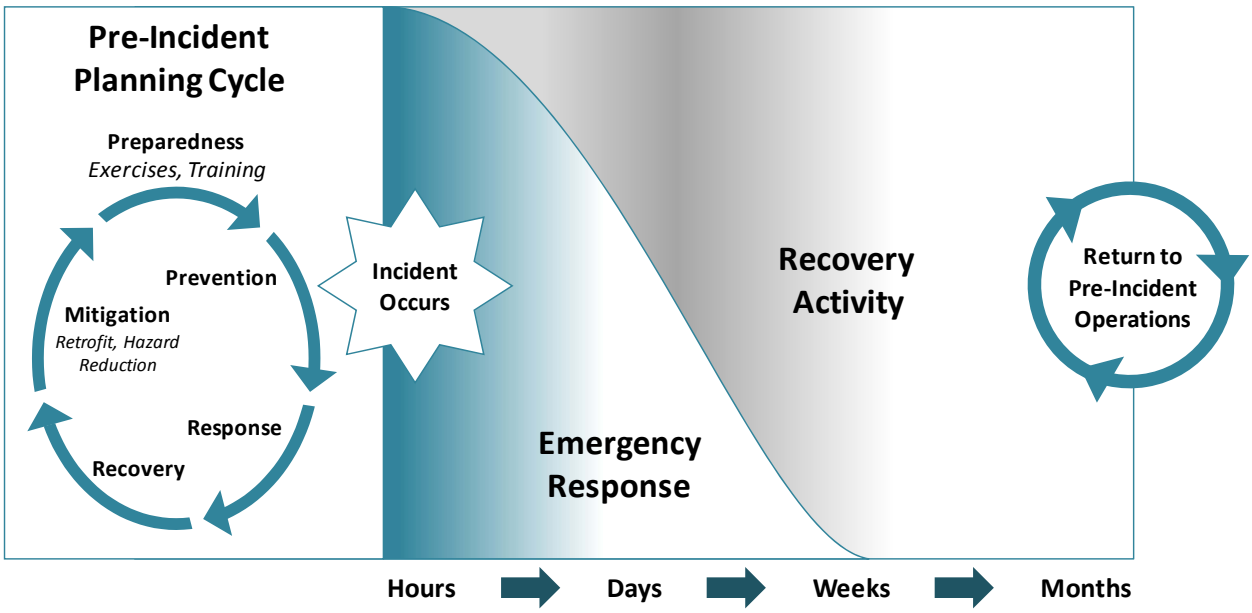
Planning to solve problems (or "address consequences") encourages a utility to take preparedness steps to decrease the vulnerability of its systems and improve its preparedness and response capabilities to reduce the impacts of any incident that might occur. Creating specific preparedness and action plans oriented to specific problems allows a utility to respond more quickly and effectively and makes a utility more resilient.

For example, as a result of all-hazard consequence management planning, a utility might reduce the impact of a power outage by specifying load requirements of each critical site and identifying the appropriate generator for that site, locating a rental yard or mutual aid source that would have appropriate generators available, determining fuel requirements, and installing load and generator-specific switch gear to optimize the acquisition and installation of portable generators. By planning what would be needed to fix the problem of a power outage in advance, a utility reduces its vulnerability and is poised to quickly respond and recover if a power outage were to occur, regardless of the cause of the outage, reducing the severity of the impact.

Why is recovery planning an important step in consequence management planning?

Preparing in advance to continue to provide services during recovery operation is very important in reducing human and economic hardships during incidents. Many utilities may be prepared to respond to the immediate consequences of an emergency and address short-duration, relatively straightforward incidents. However, when an incident is complex and extends beyond one or two work periods or shifts, a utility's response capabilities may be overwhelmed. Additionally, in a large and complex incident recovery may need to begin while initial response occurs. Figure 1 illustrates the incorporation of recovery efforts into initial response activities.

Figure 1: Relationship of Response and Recovery Efforts



The pre-incident planning cycle is meant to help utilities continuously reevaluate and improve their preparedness, response, and recovery planning through assessment, training, exercises, and implementation of improvements (retrofit, physical, and operational) that reduce their vulnerability. When an incident occurs, response begins immediately, followed quickly by the beginnings of recovery. The shading in Figure 1 is meant to indicate the intensity of activity during the emergency response and recovery activity phases—response activity is most intense when an incident occurs and then tapers off; recovery activity is most intense sometime after the initial response is over, even though it begins at the same time as the initial response. Over hours or days, as the initial emergency situation is stabilized, focus shifts from immediate response and control to recovery and improvement of systems. At the end of the recovery phase, the utility will return to a new level of pre-incident operations. Often, this new level of pre-incident operations will include lessons learned and implementation of actions that improve the operation of the utility.

What is the National Incident Management System?

Homeland Security Presidential Directive (HSPD) 5 tasked the Department of Homeland Security to develop and administer the National Incident Management System, or NIMS. It also required federal departments and agencies to adopt NIMS planning and response concepts. States, territories, local jurisdictions, and tribal entities must adopt NIMS in order to receive federal preparedness assistance. NIMS, originally published in 2004, establishes a comprehensive, national approach to incident management that is applicable at all jurisdictional levels, across all agencies, and to all domestic incidents regardless of size. NIMS is flexible but still provides a set of standardized organizational structures, as well as requirements for processes, procedures, and systems designed to improve the ability of responders (public and private) to work together. NIMS supports the effective use of mutual aid and assistance agreements and many Water and Wastewater Agency Response Networks (WARNs)

use the concepts of NIMS for a more successful program. For more information on NIMS, please view http://www.epa.gov/safewater/watersecurity/pubs/fs_watersecurity_nimsobjectives.pdf.[1]

How are the National Incident Management System and the Incident Command System incorporated into all-hazard consequence management planning?

NIMS and the Incident Command System (ICS) provide a consistent framework for preparedness, response, and recovery activities, allowing responders with different backgrounds and from different jurisdictions to respond effectively together. Understanding NIMS and ICS is very important to a utility's ability to participate and coordinate effectively in any response effort. During response and recovery efforts a utility will play two roles. First, it will manage the direct effects of the incident on the utility by directing utility response and recovery actions. Second, it will support the local Emergency Operations Center (EOC) by coordinating the utility response with the overall action plan objectives and priorities set by the local community EOC management. Communication and coordination between the utility EOC and the community EOC is critical. Both the utility-level response and the overall community-level response are carried out using NIMS and ICS.

NIMS and ICS are built around a common structure and functional organization to emergency response. The specific NIMS and ICS functions and their roles are:[2]

Management:[3] establishes policy, sets priorities, creates the course for successful accomplishment of set objectives, approves plans, manages/coordinates deployment of resources, and communicates with the public and other agencies.

Operations: develops and implements strategies and tactics to carry out incident objectives, coordinates field resources, and identifies needed personnel or resources.

Planning: collects, analyzes, and disseminates information and intelligence, manages the planning process, compiles an Action Plan and other related documents, and manages technical specialists.

Logistics: provides transportation, communications, supplies, equipment maintenance and fueling, food, and medical services for incident personnel, and all off-incident resources.

Finance: provides financial and cost analysis, oversees contract negotiations, tracks personnel and equipment time, processes claims for accidents and injuries, and works with Logistics to ensure resources are procured.

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[1] US EPA. Water Sector National Incident Management System (NIMS) Implementation Objectives. March 2009. <http://www.epa.gov/safewater/watersecurity/pubs/fs_watersecurity_nimsobjectives.pdf.>

[2] The descriptions of the NIMS and ICS functions are paraphrased from the NIMS and ICS references to illustrate the concepts for purposes of this document. They are illustrative descriptions and are not intended to replace the formal definitions established by NIMS.

[3] Command is the term used in ICS to identify the regulatory or delegated authority in the field, during response. During preparedness leadership tasks may be addressed by the management of the utility to implement, rather than leaders in the field. Hence the term Management is used.

Federal, state, and local emergency response organizations use NIMS and ICS in responding to multi-agency incidents, and they will expect utilities to understand and function within the NIMS and ICS structure. Building relationships with the local emergency management agency and other responsible partners and understanding ahead of time how they implement NIMS and ICS will help make an actual response much smoother. Utilities should identify the city or county Emergency Coordinator or Local Emergency Manager within their jurisdiction and develop operational relationships with them. These individuals can provide critical support and identify resources for a utility in an incident of any size or complexity. For information and training on how utilities can implement NIMS, please visit http://training.fema.gov/IS/NIMS.asp.

How do mutual aid and assistance agreement support consequence management planning?

Participation in mutual aid and assistance agreements such as the Water/Wastewater Agency Response Network (WARN) is a way for utilities to efficiently and effectively share resources during an incident. Utilities who are signatories to a WARN or other mutual aid agreement should include the agreement and Operational Plan in their planning process and incorporate actions needed to access assistance and aid from the WARN or other mutual aid in their consequence management plan. A WARN Operational Plan assists utilities in managing a WARN before an emergency and implementing the WARN Agreement during a response. For more information on WARNs, please visit: http://www.nationalwarn.org.

Many local and municipal utilities may also have access to mutual aid agreements through their state emergency management agencies. For example, Virginia currently has a county-level Emergency Management Assistance Compact agreement that includes participation from each jurisdiction and covers municipal water and wastewater utilities. Furthermore, some states have developed public-private aid agreements between many of the critical infrastructure and key resource sectors.

Section II: What Hazards and Consequences Should a Utility Consider?

Most utilities have completed a vulnerability assessment that identifies potential hazards. To further identify the consequences that may be important to include in their planning process, utilities might consider hazards that are likely in their geographic region, past incidents and consequences, and consequences that would be difficult to address/resolve. From that list of hazards, utilities can evaluate the consequences that are critical to their operating conditions. Once the critical consequences are identified, the utility can develop actions to mitigate the impact of these consequences on their operations. Actions might focus on mitigation, response, or recovery of the operation depending on the nature of the incident.

This document does not provide the basis for a risk assessment, vulnerability assessment, or a detailed response and recovery plan. As a guidance document, the information provided here is intended to present a thought process to move through as a utility develops its own plans. These lists are not comprehensive, and do not incorporate any analysis of the relative risk that various hazards or consequences might pose to an individual utility. For example, even though a major earthquake would be expected to have severe consequences to a water utility, the chances of a major earthquake impacting a Virginia waterworks are relatively low. Therefore, although a water utility in Virginia may address many of the same consequences seen under the earthquake category in other parts of their all-hazards planning, it may not take exactly the same preparedness or response and recovery actions that a waterworks along the west coast or in the Mississippi River region might.

Figure 2 lists common hazards and their potential related consequences. The table was developed by the Workgroup to illustrate their views on which consequences could be considered for the various hazards that utilities face. When thinking about emergency preparedness, response, and recovery, it is important that utilities consider high probability hazards that they may face and all the potential consequences that flow from them. The hazards each utility should consider will vary depending on factors such as their location, source water, infrastructure, and vulnerabilities. Utilities are encouraged to use Figure 2 as a planning tool. Utilities can clear the table and place the dots in the places that are most appropriate for their individual circumstances.

Figure 2: Common Hazards and Their Potential Related Consequences[4]

	Hazards																	
Potential Related Consequences	Flood	Extreme Winds	Lightning	Drought/Water Supply Loss	Hurricane, Tornado	Earthquake	Severe Weather (e.g. ice/snow storms)	Fire/Wildfire	Power or Communication Failure	Weapons of Mass Destruction	Cyber Attack	Infrastructure Failure	Hazardous Material Release	Vandalism/ Sabotage/ Terrorism	Economic Disruption	Supply Chain Disruption	Pandemic Flu	Perceived Incidents
Service disruption of source water, water or wastewater treatment system, storage system, distribution system, collection system, communications and power	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
System contamination including problems that are associated with threatened contamination, actual contamination and perceived contamination. All types of contamination are to be considered, including chemical, radiological, and biological.	●				●	●	●	●	●	●	●	●	●	●			●	
Damage to infrastructure	●	●	●		●	●	●	●	●	●	●	●		●				
Environmental impacts	●			●	●	●	●	●		●		●	●	●		●		
Loss of revenue or other serious economic disruption in the community, or loss of essential supplies either because contracts are voided or supplies cannot get to the area	●	●	●	●	●	●	●	●	●	●	●	●			●	●		
Denied or limited access to utility facilities and infrastructure; for example, if facilities are unsafe or unreachable	●	●			●	●	●	●		●	●	●	●					
Loss of employees/contractors; for example, if employees or contractors cannot come to work because roads are impassable or they are too sick, or they are taking care of their family	●	●			●	●	●	●		●							●	
Loss of public confidence				●					●	●	●	●	●	●	●	●		●
Loss of SCADA systems	●	●	●		●	●	●	●	●	●	●	●		●			●	

[4] This table illustrates the potential consequences that may befall utilities as a result of common hazards. The table is meant to be an example. Utilities can clear the table and modify the table to best meet their needs and situation.

Section III. Guidelines for Improving Resiliency for All Hazards and Consequences

This section describes preparedness, response, and recovery actions utilities can take to improve their resiliency across all hazards and consequences. In this context, resiliency is generally defined as the ability of a utility's business operations to rapidly adapt and respond to internal or external changes (such as emergencies) and continue operations with limited impacts to the community and customers. Remember that this is not meant to be a substitute for utility-specific emergency response planning. Utilities should use these lists of actions to expand and improve the Emergency Response Plans they may already have in place or to begin creating a written Emergency Response Plan if they do not already have one.

Preparedness Actions to Improve Resiliency Across All Hazards

Preparedness improves a utility's ability to respond to an incident with confidence and increases system resilience in a wide-spread emergency. Preparedness refers to actions, programs, policies, procedures, and systems put into place across the utility by utility management before an incident to 1) prevent or mitigate consequences and 2) support response and recovery activities. The actions listed below are intended to spark thinking and help utilities improve their general preparedness, response, and recovery plans. These are actions utilities can take to prepare for initial response and recovery to an acceptable level of operations as quickly as possible. The suggested actions are grouped according to related concepts, are not in priority order, and are intended to operate as an inter-related whole.

To help utilities consider how each of the preparedness actions might be implemented via a NIMS or ICS organization, suggested NIMS or ICS function assignments are provided in the right column of the table below. In some cases collaboration between multiple NIMS or ICS function assignments is important for completeness and accuracy of the information or plan. The actions are written with the utility's management in mind, not solely for field responders or field ICS positions. These are not rigid assignments, and may be modified or vary when applied to a particular utility or situation. As a reminder, the specific NIMS and ICS functions and their roles are: [5]

Management:[6] establishes policy, sets priorities, creates the course for successful accomplishment of set objectives, approves plans, manages/coordinates deployment of resources, and communicates with the public and other agencies.

[5] The descriptions of the NIMS and ICS functions are paraphrased from the NIMS and ICS references to illustrate the concepts for purposes of this document. They are illustrative descriptions and are not intended to replace the formal definitions established by NIMS.

[6] Command is the term used in ICS to identify the regulatory or delegated authority in the field, during response. During preparedness leadership tasks may be addressed by the management of the utility to implement, rather than leaders in the field. Hence the term Management is used.

Operations: develops and implements strategies and tactics to carry out incident objectives, coordinates field resources, and identifies needed personnel or resources.

Planning: collects, analyzes, and disseminates information and intelligence, manages the planning process, compiles an Action Plan and other related documents, and manages technical specialists.

Logistics: provides transportation, communications, supplies, equipment maintenance and fueling, food, and medical services for incident personnel, and all off-incident resources.

Finance: provides financial and cost analysis, oversees contract negotiations, tracks personnel and equipment time, processes claims for accidents and injuries, and works with Logistics to ensure resources are procured.

Know the Utility's Hazards and Consequences

Actions	NIMS/ICS Function
☐ Determine what types of incidents are high risk and high probability in the utility's area. The utility should give these types of incidents special consideration as it plans.	*Planning*
☐ Identify and implement actions that the utility can take to mitigate the consequences of high risk, high probability incidents.	*Planning*
☐ Evaluate utility system vulnerabilities and identify mitigation measures to incorporate into a recovery plan to rebuild a more resilient system.	*Planning*

Connect with the Emergency Management Agency in the Utility's Area

Actions	NIMS/ICS Function
☐ Learn the emergency operations protocols and procedures that will be enacted by local emergency responders in your area during an incident and understand how the NIMS ICS are applied in the utility's jurisdiction. Ensure key managers and system operators complete ICS 100 and 200 training at a minimum. Information on training is available at http://training.fema.gov/.	*Management*
☐ Identify and build relationships with key response partners, especially local emergency managers. For example, the utility should know who is likely to assume the position of incident commander for high risk, high probability incidents; how to work with local emergency planning committees (LEPCs); how the local and utility EOC will be activated; and what response actions the utility is likely to be called on to support as well as how local emergency responders and local EOC can support the utility.	*Management*
☐ The utility should supply copies of its emergency preparedness, response, and recovery plans and other key utility information to response partners, especially local fire departments, police departments, and the utility's local emergency management organization. Sensitive information should be safeguarded by response partners or, if	*Management*

not needed, scrubbed from plans provided to outside agencies.	
☐ Record the names and contact information for key response partners and update it frequently. Establish a time or occurrence when to update contact information, such as the start of hurricane season, the beginning of the calendar year, or after conducting exercises.	*Planning*

Identify Response Roles and Responsibilities in the Utility's Organization

Actions	NIMS/ICS Function
☐ Establish a chain of command and line of succession plan so decision-making authority is clear and responsibilities can be carried out confidently even if usual decision-makers are not available. Regularly update the chain of command and line of succession and ensure that personnel in the line of succession know the circumstances under which it is their responsibility to assume command. Establish a time or occurrence to update the chain of command and line of succession, such as the start of hurricane season, the beginning of the calendar year, or after conducting exercises.	*Management*
☐ Identify primary and alternate staff for each key position and those responsible for responding to incidents, including primary and alternate assignments for each NIMS or ICS function (management, planning, operations, logistics, and finance).	*Management*
☐ Establish protocols to collect and manage incident information, such as sampling and analysis results and incident status reports, and ensure the utility can make this information available to the incident commander, other incident response managers, local community EOC, and utility management if needed.	*Operations and Planning*
☐ Establish an incident notification flow chart clearly identifying key staff and response partners to contact. Record contact information and update it frequently.	*Planning*

Ensure Resources to Maintain Minimum Operations

Actions	NIMS/ICS Function
☐ Develop utility procedures, including easily understood checklists and/or flowcharts to identify and document: ☐ What is damaged and how; ☐ What services the utility can still safely deliver; ☐ What is needed to restore minimal service; ☐ What is needed to recover to full service; ☐ How long these different stages of recovery will take; and	*Planning*

Actions	NIMS/ICS Function
☐ What resources the utility has on hand and what additional resources it needs.	
☐ Identify the minimum resources (including personnel) the utility needs to maintain minimum operations and essential services and also identify how long the utility can maintain those operations/services without outside help. The utility should be able to maintain operations/services on its own for at least 72 hours.	*Operations and Planning*
☐ Identify key interdependencies with other sectors such as power generation, telecommunications, and chemical suppliers; consider how the utility would maintain minimum services and essential operations if another sector were to be out of service during an incident.	*Operations and Planning*
☐ Develop an internal protocol for when to activate WARN, other mutual aid arrangements, and emergency contractors. Also consider what procedures need to be in place at each utility facility to provide aid to another utility through the WARN system or other mutual aid agreements.	*Management*
☐ Establish policies to authorize expenditures for supplies and other necessary equipment during a response. This might include pre-authorizations of certain expenditures or establishing emergency accounts or contracts with suppliers or contractors. Mark all emergency-related contracts and pre-authorizations clearly so staff can find them quickly.	*Management and Finance*
☐ Establish a protocol to increase the amount of cash the utility has on hand during an incident and increase limits on employee credit cards (if applicable) to facilitate purchase of supplies/equipment during response.	*Finance*
☐ Establish a utility Emergency Operations Center or Departmental Operations Center (DOC) for the utility. This is a location where key utility employees would meet during an emergency to manage the response. The utility EOC/DOC should contain copies of all key documents and should be equipped with all of the communication systems that a utility would plan to use during an incident. It is prudent to also establish a backup EOC/DOC in the event the primary EOC/DOC is inaccessible during an incident	*Management*

Create Backup Plans for Key Functions and Resources

Actions	NIMS/ICS Function
☐ Document the skills and training of each utility employee (including equipment they are authorized to operate) and promote cross training for key operators, responders, and emergency management functions. For smaller utilities this may mean that a single employee learns multiple response functions.	*Operations*
☐ Establish backup communications networks to check on facilities that rely on telemetry	*Logistics*

Actions	NIMS/ICS Function
or other systems to manage operational systems and to communicate with utility incident command staff, partner utilities, primacy agencies and response partners if normal lines of communication are down.	
☐ Provide key utility management and staff with radios or other alternate means of communication so they can contact key facilities during an incident even if normal communication lines are down and they cannot go to the facility in person (e.g., because roads are impassable).	*Logistics*
☐ Develop alternative communications networks, including potentially a "face to face" communications network (i.e., sending a utility staff person out in a vehicle to communicate with the EOC or first responders), for use when technology-based systems have failed.	*Management*
☐ Create a contingency plan for acquisition of key resources; for example, participation in a WARN or other mutual aid network, identifying suppliers out of the immediate geographical area and entering into contracts with them in advance of an incident. Resource typing considerations must be included. Information on resource typing is available at http://www.tawwa.org/AWWA%20Resource%20Typing%20Manual.pdf.[7]	*Logistics*
☐ Prepare plans to provide for fire suppression (if this has been affected) and alternative sources of potable drinking water and wastewater facilities, if needed.	*Planning*
☐ Ensure the utility is prepared to receive equipment and/or personnel support during an incident, for example, through appropriate site preparation, equipment interoperability procedures and start-up/shut-down checklists.	*Operations*
☐ Determine generator needs for each facility in case of extended power outage. Calculate power load requirements and install appropriate quick connects and switch gear for portable generators.	*Logistics*
☐ Determine whether adequate fuel supply exists on-site to run generators for critical systems and for how long. For diesel generators, the typical consumption rate is typically 2.5 gallons per hour for every 10kW generated.	*Logistics*

[7] AWWA. Water & Wastewater Mutual Aid & Assistance Resource Typing Manual. April 2008. <http://www.tawwa.org/AWWA%20Resource%20Typing%20Manual.pdf>

Identify and Safeguard Key Utility Information for Response and Business Continuity

Actions	NIMS/ICS Function
☐ Identify key utility information and vital records, including descriptions of the system, electronic and hard copy maps, as-built drawings, deeds, site plans, and schematics with GPS locations of key infrastructure, system capabilities, and emergency resources such as backup power supplies, and redundant facilities.	*Planning*
☐ Identify key business systems, such as financial records and billing systems that will be needed to continue operations during an incident.	*Finance*
☐ Catalog and prioritize all utility control systems. Determine which control systems should be restored first in an emergency.	*Operations*
☐ Back up key utility information, vital records, and key business systems. Ensure the utility has access to these records and systems during an incident, for example, if an emergency were to make it impossible to reach utility facilities. Maintain paper copies of key information at multiple safe locations. Backed up digital data also should be stored off-site at safe locations.	*Operations, Logistics and Finance*
☐ Create a master employee list to share with first responders and emergency managers.	*Operations and Logistics*
☐ Provide staff with an official utility ID for access through police or hazmat zones or to allow movement in quarantine areas.	*Operations and Logistics*

Understand and Plan for Cost Reimbursement Procedures

Actions	NIMS/ICS Function
☐ Understand the protocols and requirements for cost reimbursement through insurance, WARN or other mutual aid agreements, and state disaster assistance programs. Ensure the utility knows what records and information will be needed to support reimbursement claims. Prepare electronic collection forms as needed to gather cost and time documentation.	*Finance*
☐ Research, understand, and prepare plans and protocols to follow the requirements identified in mutual aid agreements that may be used during local or regional incidents.	*Finance*
☐ Understand the utility's own insurance deductible, coverage, and obligations.	*Finance*
☐ Incorporate collection of cost reimbursement information (including receipts and time sheets) into the utility's response and recovery protocols.	*Finance*
☐ Develop procedures, forms, and protocols to ensure the utility collects necessary information on all response actions and expenditures (including personnel, equipment, and supplies) from the beginning of the response.	*Finance*

Train and Practice and Improve the Utility's Emergency Response and Recovery Plans Over Time

Actions	NIMS/ICS Function
☐ Implement a program/policy to support the continuous cycle of planning, training, equipping, exercising, evaluating, and taking actions to reduce potential consequences so the utility becomes better prepared and more resilient over time.	*Management*
☐ Create training and exercise plans to prepare staff and managers to carry out response actions. This could include innovative training approaches such as job shadowing and just-in-time training.	*Logistics*
☐ Establish protocols for post-incident assessments, including lessons learned and steps to take to prevent recurrence or reduce impacts, and document successes. Prepare a list of questions to ask during After Action Reviews and draft outlines of what to include in an After Action Report. Please see the FEMA HSEEP website at: https://hseep.dhs.gov/pages/1001_HSEEP7.aspx for more information.[8]	*Planning*
☐ Ensure there are documented procedures in place to carry out the reimbursement process and file appropriate insurance or post disaster public assistance claims. Please see the FEMA Applicant Handbook website at: http://www.fema.gov/government/grant/pa/apphandbk.shtm for more information.[9]	*Finance*

Establish Protocols for Communication with the Public

Actions	NIMS/ICS Function
☐ Establish crisis communication procedures and key messages for each consequence. Information on message mapping can be found on the EPA website at http://www.epa.gov/nhsrc/news/news040207.html.[10]	*Management*
☐ Establish procedures for warning customers, employees, contractors, visitors, and others who might not be familiar with the facility's warning system and what the warnings mean.	*Management*
☐ Establish procedures for providing the public with information as required by state primacy agencies and necessary under the Public Notification Rule.[11] EPA's Public Notification Handbook provides an explanation of EPA's Public Notification Rule and	*Management*

[8] US DHS. FEMA Homeland Security Exercise and Evaluation Program. <https://hseep.dhs.gov/pages/1001_HSEEP7.aspx >

[9] US DHS. FEMA Applicant Handbook. <http://www.fema.gov/government/grant/pa/apphandbk.shtm>

[10] US EPA Homeland Security Research. Message Mapping. <http://www.epa.gov/nhsrc/news/news040207.html >

[11] US EPA. National Primary Drinking Water Regulations: Public Notification Rule. 4 May 2000. State primacy agencies may have alternate or more detailed requirements. <http://www.epa.gov/ogwdw/dwa/course-npdwr.html>

Actions	NIMS/ICS Function
provides examples of effective public notices along with templates. For more information, please see the Revised Public Notification Handbook website at: http://www.epa.gov/ogwdw000/publicnotification/pdfs/guide_publicnotification_pnhandbook.pdf.[12]	
☐ Identify and document contact information for critical customers and sensitive subpopulations. Critical customers and sensitive populations could include, but are not limited to, hospitals, fire stations, schools and universities, and group elderly housing/care facilities.	*Planning*

Be Prepared to Continue Operations During Recovery

Actions	NIMS/ICS Function
☐ Prepare procedures for drafting multiple transition staffing plans such as: initial responder relief, management of ongoing day-to-day operations, managing longer-term recovery, and mitigation planning. In an incident of any complexity or size, the recovery effort may need dedicated staff.	*Logistics*
☐ Research and maintain documents required to obtain permits for construction, wastewater discharges, and/or other regulatory authorizations that might be needed during recovery.	*Planning*
☐ Determine what skill sets and certifications are needed to start and run critical equipment and note the personnel who meet the requirements. Cross train staff to ensure availability of employees with essential skills; this includes having the appropriate number of certified operators to operate the facility during staff shortages.	*Operations, Logistics*
☐ If not already written, consider developing start/connect checklists specific to individual equipment and make them accessible to staff and emergency response personnel. This is especially helpful if an emergency responder or untrained utility staff person has to operate the equipment and not a trained utility staff person.	*Operations*
☐ Consider developing site-specific expedient training videos on how to perform critical tasks that can be viewed by personnel who do not normally perform those tasks. Training videos can be as simple as a recording of staff performing critical tasks.	*Logistics*

[12] US EPA. Revised Public Notification Handbook. March 2007. <http://www.epa.gov/ogwdw000/publicnotification/pdfs/guide_publicnotification_pnhandbook.pdf>

Be Prepared to Support Employees During an Emergency

Actions	NIMS/ICS Function
☐ Maintain food, potable water, first-aid, and other emergency supplies at all facilities where personnel work.	*Logistics*
☐ Sheltering-in-place may be required during certain types of emergencies, including severe weather, chemical release, terrorist/hostile attack, and civil unrest. Review, document, and practice how to turn off HVAC with outside air exchange systems such as air conditioners. (See Figure 3.)	*Logistics*
☐ Encourage employees to have personal emergency preparedness plans in order and establish protocols to help employees working in an emergency check on the safety of their families. This may include providing model family emergency plans for employees to use. (See Figures 5 and 6.)	*Management*
☐ Document emergency contact information for all utility staff and keep it with the utility's emergency response and recovery plans. (See Figure 4.)	*Planning and Logistics*

Figure 3: Shelter-in-Place Checklist[13]

Sheltering-in-place may be required during certain types of emergencies, including severe weather, chemical release, terrorist/hostile attack, and civil unrest. The Emergency Action Coordinator (EAC) will coordinate with the Emergency Control Center during a shelter-in-place action.

✓	LINE #	TASKS
	1	Notify personnel to shelter-in the building, or as directed by facility/site announcements.
	2	Ensure that all windows and doors are closed.
	3	Ensure that all personnel remain indoors. Do not allow personnel to leave the building unless approved by the incident commander.
	4	Ensure that all ventilation systems are configured to minimize air intake and/or recycle internal air, if required.
	5	Identify a single door for entry into the building, and post a door monitor.
	6	Maintain a list of personnel in the building.
	7	Isolate personnel who may be contaminated.
	8	If sheltering-in is the result of a hazardous materials release, do not allow personnel to smoke, eat, drink, apply cosmetics, or chew tobacco or gum.
	9	Follow instructions from the appropriate authority.
	10	Maintain log of actions and forward to the EAC at the conclusion of the emergency event.
NOTES		

Figure 5: My Personal Emergency Checklist

✓	LINE #	*Visit www.ready.gov*
Contact Information		
	1	Enter ICE (In Case of Emergency) number into your mobile phone, to ensure Police and Ambulance know who to contact.
	2	Establish one out-of-town person or relative with whom everyone should call and check-in.
	3	Create a Family Communication Plan with the contact name, phone number, out-of-town contact name and phone number, and meeting place.

Figure 4: Utility Contact Information

NAME	OFFICE NUMBER	CELL NUMBER
Command Staff		
Administration		
Safety/Security		
Public Information Officers		
DWR Call Center		

Figure 6: Family Emergency Plan

EMERGENCY CONTACT NAME:	
TELEPHONE:	
OUT-OF-TOWN CONTACT NAME:	
TELEPHONE:	
NEIGHBORHOOD MEETING PLACE:	
TELEPHONE:	
OTHER IMPORTANT INFORMATION:	
DIAL 911 FOR EMERGENCIES	

[13] These are sample pages from a pocket sized employee action guide book created by a utility. For a complete set, see the Georgia WARN website: http://www.gawarn.org/.

Response and Recovery Actions for All Hazards

Response and recovery actions should begin simultaneously when an incident occurs. Response is the reaction to an incident ranging from immediate actions to strategies which address the consequences. Response generally refers to the actions that are taken by the "responders" including situation assessment, life safety, property protection, hazard reduction, environmental assessment and protection, and stabilization of the operation. Response protocol is generally defined in Emergency Response Plans and is taught as part of the ICS 300 series training under the FEMA learning program. For information the ICS 300 training series, please visit http://www.fema.gov/emergency/nims/NIMSTrainingCourses.shtm. Information on the FEMA learning program is also available at http://training.fema.gov/.

Recovery is the work that is needed to restore the system and return service to pre-incident levels or improved service levels. In some situations, recovery may have to be accomplished in phases in order to provide the best possible solution to the greatest number of persons impacted. For example, restoring pressure in a water utility for fire suppression may be more important than providing potable drinking water immediately after the incident. Every response and recovery effort should include an assessment of the incident and potential improvements that would mitigate future consequences from a similar event. Response and recovery are discussed in detail in the Response Protocol Toolbox, available at http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module6.pdf.[14]

Listed below are suggested actions oriented specifically to the response and recovery phases to be considered in the development of preparedness documents, including action plans, Emergency Response Plans, or hazard mitigation plans. They are intended to provide supplemental information that should be considered and do not replace the need for a detailed Emergency Response Plan. If all these items are considered in a utility's plans, the utility is well on its way to having a complete consequence management plan. To reinforce the importance of the NIMS and ICS roles during any response and recovery, the actions are organized by NIMS or ICS functions. These are not rigid NIMS or ICS assignments, and may be modified or vary when applied to a particular utility.

Overall Objectives

☐ Ensure incident action plans include provisions to protect

- Life,
- Safety and health of employees,
- Responders and the public,
- Property,
- The environment, and
- Economic stability

☐ Conduct damage assessment procedures and report data.

[14] US EPA Office of Ground Water and Drinking Water. Response Protocol Toolbox: Planning for and Responding to Drinking Water Contamination Threats and Incidents. Interim Final, April 2004. <http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module6.pdf>

- ☐ Coordinate actions with emergency responders, local law enforcement, and the local community EOC.
- ☐ Implement plans to provide for alternate fire suppression (if this has been affected) and alternative potable drinking water supplies and wastewater facilities, if needed.
- ☐ Determine personal protective equipment needed to ensure employee safety.
- ☐ Conduct safety briefings on unusual hazards and personal safety (e.g., downed power lines, hazardous materials, standing water, poisonous snakes, etc.)

Incident-specific objectives are developed and described in Incident Action Plans. Incident Action Plans are created by considering information about the incident and establishing objectives to address the incident. The objectives need to be Specific, Measurable, Achievable, Reasonable, and complete within a set Time (SMART). The objectives can apply to all responders, or be assigned to specific ICS positions. The objectives are listed in priority order focused on life and safety first. Input from each ICS function is important to gather in creating and approving the objectives. Once approved, the objectives are published and announced.

Management Function Actions

- ☐ Activate the Emergency Response Plan, chain of command, and staffing plans.
- ☐ Send a utility agency representative to establish contact with the local community EOC to coordinate emergency management with regulatory agencies, technical resources and other infrastructure (e.g., power companies). In the case of a criminal incident, coordination with law enforcement will be required. In coordination with EOC staff, identify and communicate with critical customers and sensitive subpopulations. Communicate any suspected contamination to appropriate regulatory and public health officials. Use the utility's prepared list of contacts.
- ☐ Implement communication plans including face to face contacts as needed to ensure outside agency contact.
- ☐ Provide clear communication with the public and with the local community EOC when initiating and rescinding water advisories. Ensure these notifications meet federal and state requirements.
- ☐ Activate staff and public notification plans as required by the consequence.
- ☐ Provide the public with information according to the utility's public notification plan that meets federal and state requirements.
- ☐ Request assistance or aid by activating the WARN or other mutual aid agreements, if necessary.

Operations Function Actions

- ☐ Carry out actions according to the utility Action Plan. This may include actions to provide alternative water service for fire suppression, alternative or bottled water for consumption, and alternative wastewater treatment options.
- ☐ Gather information to document response actions and expenditures to support reimbursement efforts.

- ☐ Identify staffing capabilities and shortages. Request staffing support and update the staffing plan as necessary.
- ☐ Switch to manual operations as needed.
- ☐ Outline facility restoration priorities and plans as needed.
- ☐ Deploy/request emergency power generators as needed.
- ☐ Ensure staff document time and expenses per emergency work site(s).

Planning Function Actions

- ☐ Create a utility Action Plan based on incident objectives provided by management or incident command and, in the case of multi-agency incidents, in coordination with the overall Action Plan established by the local community EOC. Flow diagrams similar to the one depicted in Figure 7 can help utilities formulate their Action Plans. Figure 7 is an excerpt of a flow diagram developed by a utility as part of its preparedness activities.
- ☐ Activate utility damage assessment procedures and document:
  - ☐ What is damaged and how,
  - ☐ What services the utility can still safely deliver,
  - ☐ What is needed to recover minimal service,
  - ☐ What is needed to restore to full service, and
  - ☐ How long these different stages of recovery will take.
- ☐ Access emergency/backup data, maps, and systems as needed.
- ☐ Determine if utility and local incident resources are adequate or if the utility needs to access additional resources such as more specialized resources for damage assessment, longer-term recovery, site characterization, and/or management and disposal of contaminated water, wastewater, and other materials.
- ☐ As part of the Action Plan, establish work priorities for incoming mutual aid resources as appropriate.
- ☐ Obtain any permits or other regulatory authorizations (e.g., waivers) that may be needed for response and recovery activities.
- ☐ Create a Demobilization Plan when appropriate. This plan should include the process to demobilize initial response resources including those provided through mutual aid arrangements and alternative water supplies or bypasses as appropriate.
- ☐ Upon demobilization, evaluate lessons learned, identify steps to take to prevent recurrence or lessen impacts, and document successes.

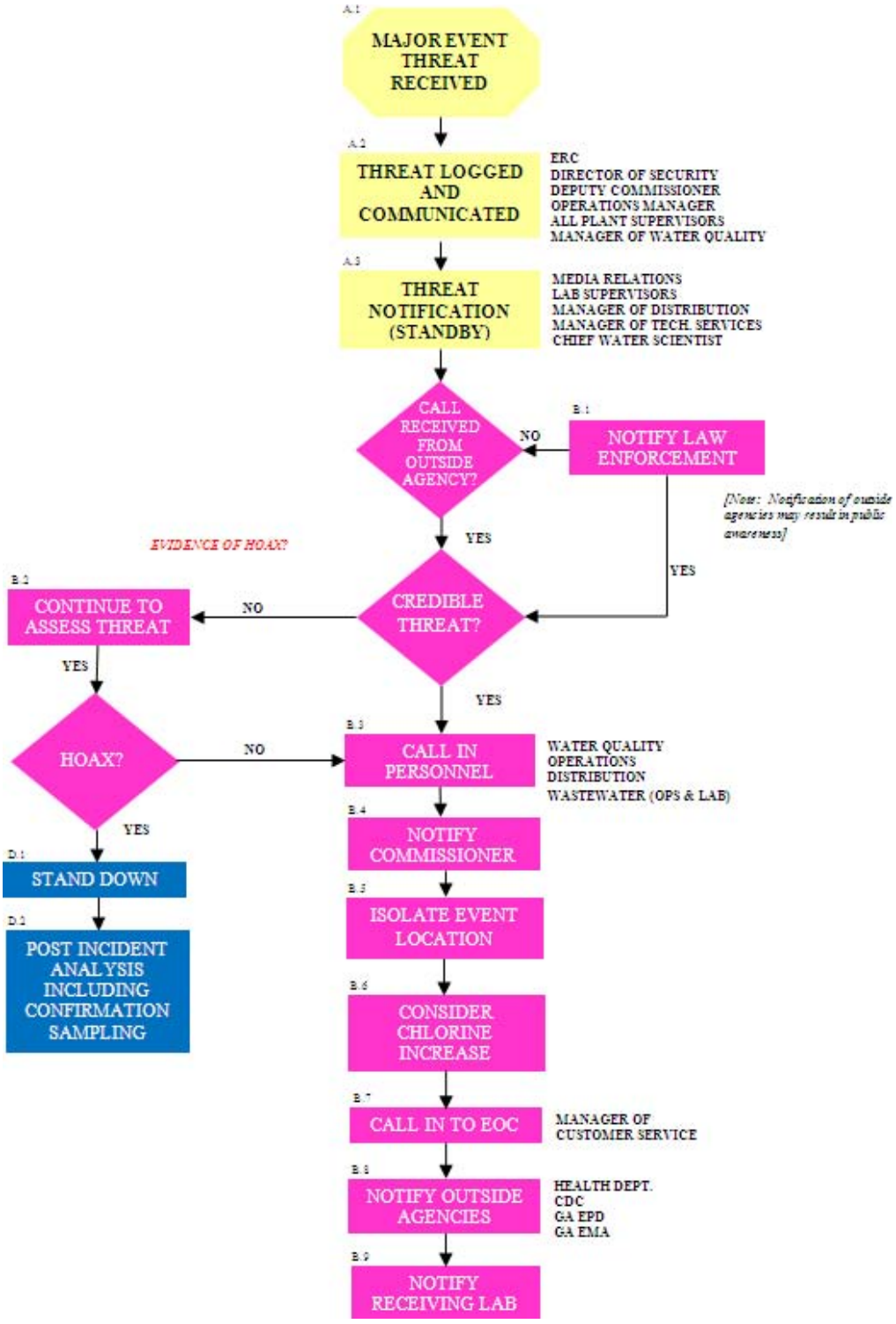
Logistics Function Actions

- ☐ Obtain and mobilize off-incident resources to execute actions needed to implement the Incident Action Plan.
- ☐ Implement a transition staffing plan for staff relief, return to work, maintaining day-to-day operations, and recovery.
- ☐ Activate emergency contracts as needed.
- ☐ Coordinate feeding, lodging, and maintenance support for mutual aid crews.
- ☐ Determine ability of key vendors to provide critical resources/services. Locate alternate vendors as needed.
- ☐ Collect information on status of facilities and assess impact on employee needs including safety, first aid, food, potable water, wastewater facilities, and on status of staff's families.
- ☐ Notify family members of the status of employees on duty, as appropriate.

Finance Function Actions

- ☐ Access emergency funds, including cash, as needed.
- ☐ Document response/remediation actions and expenditures for reimbursement.
- ☐ Use forms and formulas required to document costs of incident response for state, federal, and insurance reimbursements.
- ☐ Notify insurance carrier and file appropriate claims.
- ☐ Prepare appropriate documentation to file public assistance claims, if available and appropriate for the utility.

Figure 7: Major Event Flow Chart[15]



[15] This diagram is a portion of a flow chart included in the response plan of a utility. For more detailed information on how to create these types of flow charts, see the Georgia WARN website: http://www.gawarn.org/.

Section IV. Consequence-Specific Actions

In addition to the all-hazard planning, response, and recovery actions identified in the previous section, the following lists highlight specific planning, response, and recovery actions for specific types of incidents. As with the all-hazard actions, these lists are not meant to be a substitute for utility-specific emergency response planning. Utilities should use these lists to expand and improve the emergency response plans they may already have, or help start creating an Emergency Response Plan if one is not in place.

The specific types of incidents addressed are:

- Loss of power
- Communications loss
- SCADA loss
- Service disruption
- Reduced workforce (e.g., because of pandemic flu or other disruption)
- Contamination incidents
- Economic disruption

To reinforce the important role that NIMS and ICS will play during preparedness, response, and recovery, the actions are organized by specific suggested NIMS or ICS functions. These are not rigid NIMS or ICS assignments, and may be modified or vary when applied to a particular utility.

Specific Actions for Loss of Power

Loss of power can interrupt the utility's ability to treat or deliver drinking water and to treat and discharge wastewater. It is very important that water and wastewater utilities prepare for a loss of power through redundant and back-up electrical service supplies and know what they will do to respond and recover in the event of a loss of power. Utilities should document and understand electrical service system operation and power needs. Performing regular maintenance on primary and backup electrical systems is also helpful to prepare for (and recover quickly from) a loss of power.

Utilities should incorporate the following actions specific to loss of power incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Loss of Power Incidents

Document the Utility's Electric System and Have a Plan for Critical Equipment

Actions	NIMS/ICS Function
☐ Document water, wastewater, and electrical system information (e.g., maximum day demand, average daily demand, and equipment specifications).	*Operations, Planning*
☐ Evaluate electrical distribution within the facility. Consider alternative or dual electrical service sources and consider establishing feed capabilities so that electrical service can be distributed within the plant in case of an internal interruption.	*Operations, Planning*
☐ Ensure that critical equipment can be operated using the alternative power source. For alternative sources such as a portable generator, ensure that all required electrical wiring is pre-installed.	*Operations*
☐ Update critical equipment lists, generator capacity calculations, and start/connect lists annually or as new equipment is phased into a facility.	*Planning*
☐ Verify critical equipment that is served by redundant primary feeds also has redundant secondary control voltage electrical service supply sources.	*Planning*
☐ Calculate electrical service demands for start-up of critical equipment. Remember, start-up surge requires two to three times more electrical load than normal running demands.	*Planning*
☐ Identify critical equipment at each site and document voltage, phase configuration, and horsepower/amperage requirements.	*Planning*

Actions	NIMS/ICS Function
☐ Ensure radio equipment has alternate electrical service sources and is compatible with first responder radio equipment. It may also be worthwhile to ensure radio compatibility with neighboring utilities; utilizing compatible communications equipment that meets federal standards will facilitate information flow among responders and the utility. Be sure to also evaluate compatibility of data networks, if possible.	*Planning*
☐ Regularly test operational capability of alternate power sources in real-time situations.	*Operations*
☐ Identify any insurance rate reductions that could apply given the effort to manage operations during a loss of electrical service.	*Finance*

Work with the Local Electric Utility in Advance

Actions	NIMS/ICS Function
☐ Establish a liaison with the electric utility service provider to communicate information on the power restoration process and status. It is critically important that the electric utility understand the water system's priority needs well in advance of an incident.	*Management*
☐ Determine treated water/wastewater storage capability within the utility's collection and distribution systems. This will allow the utility to develop alternate pumping plans to continue to provide service during short term power outages.	*Operations, Logistics*

Generators

Actions	NIMS/ICS Function
☐ Determine whether or not current generators can support all electrical service critical needs equipment.	*Planning*
☐ Determine if staff is well-versed in operating and maintaining existing generator(s). If not already written, consider developing a "start and connect" checklist specific to each individual generator.	*Operations*
☐ Develop service agreements for semi-annual inspections from an authorized service center.	*Logistics*
☐ Establish routine (weekly, monthly, bi-monthly) internal start procedures for all generators. Frequency may depend on air quality rules.	*Operations*
☐ Obtain a list of generators available for rent in the utility's area and establish priority rental agreements with local companies.	*Logistics*
☐ Establish agreements with surrounding utilities. Identify equipment available for use.	*Management*

Actions	NIMS/ICS Function
☐ Determine how long it is reasonable to power systems locally from back-up generators by coordinating with the power company and local emergency managers. The utility can then determine if it has the proper switching equipment to run existing generators or the interconnection for portable generators to provide electrical service for critical equipment.	*Planning*
☐ Determine whether adequate fuel supply exists on-site to run generators for critical systems and for how long. For diesel generators, the typical consumption rate is typically 2.5 gallons per hour for every 10kW of power generated.	*Planning, Logistics*
☐ Determine how accessible fuel sources for generators and other critical equipment would be during hazardous conditions, including power outages at refueling depots. Consider how additional fuel can be delivered if primary roads are impassible.	*Logistics*
☐ Evaluate the size and lengths of portable power generator cable needed to keep on hand to power critical process areas and equipment with portable generators during an incident.	*Planning*
☐ Evaluate the generator(s) location and protection to withstand area hazards and operate in all conditions.	*Planning*
☐ Perform regular preventative maintenance and testing of automatic transfer switches and generators to ensure proper operation and reliability of performance.	*Logistics*

Response and Recovery Actions for Loss of Power Incidents

Actions	NIMS/ICS Function
☐ Initiate back up power systems to maintain utility operations, if possible.	*Operations*
☐ Take actions necessary to respond to the outage and repair the problem; this likely will involve coordination with the electrical service company. Determine if utility resources are adequate to respond to the loss of power or if assistance is needed.	*Operations*
☐ Establish a maintenance plan to support generators, including a schedule to mitigate generator down time for maintenance activities.	*Logistics*
☐ Establish a fueling plan to support generators.	*Planning, Logistics*
☐ Repair equipment that may have been damaged by the loss of power.	*Logistics*
☐ Identify loss of revenue and costs associated with response to file claims with insurance or public assistance, if available.	*Finance*

Additional Resources

There are numerous fact sheets and resources available to help utility staff prepare for a loss of power. For more information, please refer to:

- ASIS International. *ASIS Disaster Preparation Guide*. 2003. <http://www.asisonline.org/newsroom/crisisResponse/disaster.pdf>
- US EPA New England. *Is Your Water or Wastewater System Prepared? What You Need to Know about Generators*. US EPA, 901-F-09-027, September 2009. [not yet published] <http://www.epa.gov/region01/>
- US EPA Office of Water. *Large Water System Emergency Response Plan Outline: Guidance to Assist Community Water Systems in Complying with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002*. US EPA, 810-F-03-007, July 2003. <http://www.epa.gov/safewater/watersecurity/pubs/erp-long-outline.pdf>
- Washington Department of Health. *Emergency Response Planning Guide for Public Drinking Water Systems*. DOH PUB. #331-211, May 2003. <http://www.doh.wa.gov/ehp/dw/security/331-211_5-13-03_Emergency_Response_Planning_Guide.pdf>
- Water Infrastructure Security Enhancements (WISE) Initiative. *Recovery Practices Primer for Natural Disasters*. September 2008. <http://www.asce.org/files/pdf/wise/6.pdf>

Specific Actions for Loss of Communications

A communication system failure during an emergency incident can disrupt a utility's ability to send internal and external communications notifying staff and the public of a potential health and safety risk. It is very important for utilities to have communication protocols and a contingency plan with a precise strategy for distributing timely communications to notify customers, proper authorities, partnering water and wastewater agencies, and utility staff.

Utilities should incorporate the following actions specific to loss of communication incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Loss of Communication Incidents

Actions	NIMS/ICS Function
☐ Identify, catalog, and prioritize all utility communication systems. Establish a plan identifying the order in which communication systems should be restored in an emergency.	*Planning*
☐ Identify alternative methods of communications between utility incident command staff, partner utilities, and local government emergency services (fire, police, Office of Emergency Management, etc.).	*Logistics*
☐ Establish backup communications networks to check on facilities that rely on telemetry or other systems, such as SCADA, to manage operational systems.	*Logistics*
☐ Develop alternative communications networks, including potentially a "face to face" communications network (i.e., sending a utility staff person out in a vehicle to communicate with the EOC or first responders), for use when technology-based systems have failed.	*Management*
☐ Provide key utility incident command staff with radios or other means of communication so they can contact the facility during an incident, even if they are unable to make it into work.	*Logistics*
☐ Obtain equipment capable of unifying communications into a single device. (e.g., radio, cell phone, broadband services) to enable key personnel to communicate through a variety of methods to both access information and distribute information effectively during the incident.	*Logistics*
☐ Institute an internal system for warning personnel of an emergency. The system should: ☐ Be audible, visual and/or within view of all utility personnel, ☐ Have a back-up power supply, and	*Planning*

Actions	NIMS/ICS Function
☐ Have a signal that is unique from other alarms.	
☐ Maintain updated contact information for internal and external incident command staff.	*Management*
☐ Establish procedures for warning customers, contractors, visitors, and others who may not be familiar with the facility's warning system. The utility's primary warning system may be directly impacted by a loss of communications, so backup or secondary warning systems should be considered.	*Management*
☐ Consider methods to help employees check on the safety of their families during a communications disruption.	*Operations, Planning, Logistics*
☐ Create vendor agreements to acquire and store emergency phones and cell phones (and batteries) in case of an internal communications failure.	*Logistics*
☐ Identify primary and secondary radio communication resources powered with batteries or emergency generators in case of an external communications system failure	*Logistics*
☐ Identify key personnel who will have access to secondary emergency radio communication resources and have a protocol to quickly activate the secondary system so these key personnel can continue to communicate.	*Logistics*
☐ Identify alternative means of communicating with financial institutions if normal communications systems are unavailable.	*Logistics*
☐ Ensure procedures are in place to transmit essential messages to customers if traditional communication methods are unavailable.	*Management*
☐ Identify means and methods to distribute hard copy information to the affected customers. This can include: ☐ Identifying local printing facilities who can produce large numbers of flyers/notices during power outages; ☐ Posting information at local grocery stores, city facilities, shelters, schools, etc.; ☐ Identifying staff who can walk designated routes that are safe and accessible, through the impacted area, providing affected customers with information; ☐ Providing information to all employees who can be working in or around the impact zone; and ☐ Considering multiple language needs of the population.	*Management*
☐ Identify and document contact information for critical customers and sensitive subpopulations and determine how you will transmit information if normal communication systems are lost. Critical customers and sensitive populations could	*Planning*

Actions	NIMS/ICS Function
include, but are not limited to, hospitals, fire stations, schools and universities, and group elderly housing/care facilities.	

Response and Recovery Actions for Loss of Communication Incidents

Actions	NIMS/ICS Function
☐ Activate alternate communications systems.	*Operations*
☐ Assess damage to communication systems.	*Planning*
☐ Implement alternate communications plans to communicate information to affected customers and sensitive subpopulations.	*Management*
☐ Activate staff and public notification plans as required by the consequence.	*Management*
☐ Provide the public with information according to the utility's public notification plan that meets federal and state requirements.	*Management*

Additional Resources

There are numerous fact sheets and resources available to help a utility prepare for a loss of communications. For more information, please refer to:

- ASIS International. *ASIS Disaster Preparation Guide*. 2003. <http://www.asisonline.org/newsroom/crisisResponse/disaster.pdf>
- FEMA. *Emergency Management Guide for Business and Industry A Step-by-Step Approach to Emergency Planning, Response and Recovery for Companies of All Sizes*. October 1993. <http://www.fema.gov/business/guide/index.shtm>

Specific Actions for Loss of SCADA Systems

The loss, interruption, or failure of a supervisory control and data acquisition system (SCADA) can disrupt a utility's ability to operate, potentially causing a major service disruption. It is very important that utilities secure SCADA systems and have a contingency plan in place with instructions on how to run utility systems manually, should the automated systems fail.

Utilities should incorporate the following actions specific to loss of SCADA systems incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Loss of SCADA Incidents

Actions	NIMS/ICS Function
☐ Identify and provide advanced SCADA training to key utility incident commanders and IT staff responsible for SCADA operations and system maintenance.	*Planning, Operations*
☐ Maintain updated contact information for SCADA IT staff.	*Management*
☐ Ensure that all equipment default passwords are changed upon installation.	*Management*
☐ Establish and implement regular procedures and policies for staff access, passwords, log-ins, and email accounts related to SCADA and other utility IT systems. The policies should identify access protocols for new and departing utility staff.	*Operations, Information Technology*
☐ Conduct vulnerability assessments of SCADA systems on a regular basis including security penetration testing to detect pathways for security breaches.	*Planning, Information Technology*
☐ Conduct regular checks of the SCADA system to ensure that it is running properly and manually verify that SCADA readings are correct.	*Planning, Information Technology*
☐ Establish a method of verifying SCADA system data in the event that utility staff suspect that something may be wrong with the system (e.g., system malfunction or technical error).	*Planning, Information Technology*
☐ Consider establishing a backup or alternative system independent of the SCADA system to run checks on the SCADA and to use as a backup system in the event that the SCADA system fails. Periodically conduct exercises to run selected operations from the backup SCADA system. Ensure any alternative system has adequate security procedures.	*Management*
☐ Establish alternative locations for operating SCADA systems. Alternative locations should include the necessary telephones, computers and other equipment and supplies. Consider whether the SCADA system can be operated from independent locations	*Operations*

Actions	NIMS/ICS Function
during a pandemic.	
☐ Ensure there are procedures to shift control of systems from SCADA to manual operations and periodically conduct exercises to run selected operations manually. Develop staffing plans to ensure the utility can run the system manually, including during reduced workforce incidents such as pandemic flu.	*Operations*
☐ Develop a training guide for manual operation of utility control systems.	*Operations*
☐ Ensure the SCADA system guide is accessible to utility staff and emergency personnel.	*Operations*
☐ Maintain an adequate inventory of SCADA system spare parts and hardware.	*Logistics*
☐ Perform a SCADA incident test to determine whether staff can operate the treatment, distribution, collection systems, and plant equipment. Document any sections of the utility operation that will not be able to function during an outage.	*Operations*
☐ Establish a vendor agreement to access contractor and IT support in case of a SCADA interruption or failure, particularly during a pandemic.	*Logistics*
☐ Determine if there are any elements of the SCADA system that require hardening. This could include making systems less vulnerable through equipment upgrades or redundancy of system components.	*Planning*

Response and Recovery Actions for Loss of SCADA Incidents

Actions	NIMS/ICS Function
☐ Assess damage to systems.	*Planning, Information Technology*
☐ Implement backup SCADA system or shift to manual control.	*Operations*
☐ When able, restore SCADA systems.	*Operations*

Additional Resources

There are numerous fact sheets and resources available to help the utility prepare for a loss of SCADA systems. For more information, please refer to:

- American Gas Association. *Cryptographic Protection of SCADA Communications*. March 2006. <http://www.waterresearchfoundation.org/research/TopicsAndProjects/Resources/SpecialReports/2969/AGAPart1.pdf>

- US EPA Office of Water. *Guidance for Water Utility Response, Recovery and Remediation Actions for Man-Made and/or Technological Emergencies*. April 2002. http://www.nesc.wvu.edu/ndwc/pdf/misc/er-guidance-1.pdf

Specific Actions for Service Disruption Incidents

A variety of emergencies, such as natural hazards, equipment failure, or sabotage, can render a utility unable to provide drinking water and/or wastewater treatment services because of their interdependencies with other utilities. It is very important that utilities prepare for service disruption by ensuring access to redundant and back-up water supplies and equipment, as well as wastewater treatment facilities. A utility should also know what it will do to respond and recover if a service disruption does occur. Utilities should have a plan to implement operational and communications response actions that will minimize public health impacts and ultimately return the system to normal operations.

Utilities should incorporate the following actions specific to service disruption incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Service Disruption Incidents

Actions	Function
☐ Document water and wastewater system information (e.g., maximum and average daily demand). This should include an estimate of water supply needed to meet system demands.	*Operations, Planning*
☐ Evaluate and document water supply, treatment, and delivery based on mandatory water conservation to determine the minimum operational requirements during a long-term recovery phase.	*Planning*
☐ Determine if potable water service is necessary to cool pump motors at wastewater pump or lift stations. If so, develop an alternate cooling methodology.	*Operations, Planning*
☐ Train staff on manual operation of critical systems; often the SCADA and other control systems typically used to operate utility systems may not be available during an emergency. Perform a manual operation test annually.	*Operations, Logistics*
☐ Maintain records and conduct training on alternate methods of disinfection should full service restoration not be possible in the near-term.	*Operations*
☐ Establish alternative sources of potable and non-potable water including tankers, interconnects, emergency sources, and mutual aid agreements.	*Planning*
☐ Establish procedures for evaluating the nature, cause, extent, and likely duration of the service disruption.	*Operations*
☐ Identify the utility's critical customers and those that require service to be restored soonest (e.g., hospitals, nursing homes). Develop plans to maintain (or quickly restore) service to those customers through backup or alternate supplies. In addition, consider the effects of fire flow requirements and incorporate this into plans to maintain and/or	*Planning*

Actions	Function
restore service.	
☐ Establish procedures for identifying alternative or back up water supplies, work-arounds, or other methods to minimize the effects of a service disruption.	*Planning*
☐ Check locations of valve boxes and manholes to ensure that that they have not been paved over, and that staff know their locations accurately. Exercise all valves in the distribution/collection systems at least annually.	*Operations*

Response and Recovery Actions for Service Disruption Incidents

Actions	Function
☐ Implement procedures for evaluating service disruption nature and cause.	*Operations*
☐ Assess the potential public health threat and threat to the environment from the service disruption.	*Operations, Planning*
☐ Assess critical customer needs based on the incident and take steps to restore service to critical customers.	*Planning, Operations*
☐ Activate agreements for the provision of potable water for citizens and staff as needed.	*Logistics*
☐ For wastewater utilities, determine the best methodology and location to bypass overflows due to equipment malfunction and/or power outages.	*Operations, Planning*

Additional Resources

There are numerous fact sheets and resources available to help prepare a utility for a service disruption. For more information, please refer to:

- ASIS International. *ASIS Disaster Preparation Guide*. 2003. <http://www.asisonline.org/newsroom/crisisResponse/disaster.pdf>
- US EPA Office of Water. *Water Security Initiative: Interim Guidance on Developing Consequence Management Plans for Drinking Water Utilities*. EPA 817-R-08-001, October 2008. <http://www.epa.gov/safewater/watersecurity/pubs/guide_interim_cmp_wsi.pdf>
- Water Infrastructure Security Enhancements (WISE) Initiative. *Recovery Practices Primer for Natural Disasters*. September 2008. <http://www.asce.org/files/pdf/wise/6.pdf>

Specific Actions in the Event of a Reduced Workforce

Many types of incidents could make it difficult or impossible for utility employees to get to work. Natural disasters might make roads or bridges impassable. Pandemic flu or other disease outbreak might require employees to stay home. A utility must be prepared to continue operations and respond during an emergency with a reduced staff.

Utilities should incorporate the following actions specific to reduced workforce incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Reduced Workforce Incidents

Make Clear Assignments and Back-Up Assignments

Actions	NIMS/ICS Function
☐ Identify a clear chain of command in each department of the utility to assure continuous leadership. Keep in mind that as personnel change, new assignments must be made.	*Management*
☐ Identify the emergency response providers for the utility. A utility may have to call on emergency service providers for help if staff is drastically reduced (e.g., pandemic flu). Identify contact information of the agencies/departments, and update this information at least annually.	*Management*
☐ Review the utility Emergency Response Plan to identify primary and alternate staff for each key position and those responsible to respond as incident command in the field.	*Management*
☐ Review departmental succession plans to be sure alternate staff has the correct purchasing authorities.	*Finance*

Ensure the Utility Can Reach Employees

Actions	NIMS/ICS Function
☐ Document emergency contact information for all utility staff and keep it with emergency planning documents. Contact information should include home addresses, phone numbers and any other means of contact. Given the frequency of employee turnover and changes in cell phone service, staff contact information should be updated quarterly. Contact information is considered sensitive by many employees so safeguard contact information.	*Management*
☐ Establish a protocol for utility employees to call and leave a message indicating their situation and whether or not they will be able to make it into work and establish a way	*Logistics*

Actions	NIMS/ICS Function
to notify and/or communicate with utility employees who are unable to come in to work. For example, consider setting up a 24-hour employee hotline or provide a phone number staff can call to access emergency information.	
☐ Provide key response staff with radios or other means of communication so they can contact the facility during an incident, even if they are unable to make it into work.	*Logistics*
☐ Establish alternative working options that may include telecommuting, off-site access to SCADA, or other options for key staff.	*Logistics*

Document Employee Skills, Train, and Cross Train

Actions	NIMS/ICS Function
☐ Train employees on emergency policies and procedures.	*Logistics*
☐ Ensure adequate employee protective equipment is stored onsite.	*Logistics*
☐ Train employees on basic actions such as social distancing, hand washing, and staying home when sick.	*Logistics*
☐ Minimize staff interaction with public or other sources where they may contract a viral infection.	*Logistics*
☐ Contact regulatory agencies to determine potential flexibility of staffing requirements during emergencies.	*Management*
☐ Conduct regular emergency or incident response training and exercises with primary and alternate staff as well as local first responders and emergency management.	*Logistics*
☐ Determine what skill sets and certifications are needed to start and run critical equipment and note the personnel who meet the requirements. Cross train staff to ensure availability of employees with essential skills; this includes having the appropriate number of certified operators to operate the facility during staff shortages.	*Operations, Logistics*
☐ If not already written, consider developing start/connect checklists specific to individual equipment and make them accessible to staff and emergency response personnel. This is especially helpful if an emergency responder or untrained utility staff person, rather than a trained utility staff person, has to operate the equipment.	*Operations*
☐ Consider developing site-specific expedient training videos on how to perform critical tasks that can be viewed by personnel who do not normally perform those tasks. Training videos can be as simple as a recording of staff performing critical tasks.	*Logistics*
☐ Create a master employee list to share with first responders and emergency managers.	*Operations and Logistics*

Actions	NIMS/ICS Function
☐ Provide staff with and official utility ID for access through police or hazmat zones or to allow movement and mobility during quarantine areas.	*Operations and Logistics*
☐ Document the training and skills of each employee and include the equipment they are trained to operate. Consider documenting the skill profiles and contact information of retired employees as well; it might be possible to call up retirees in an emergency.	*Operations*

Have Ready Information to Help Responders and Back-Up Workers

Actions	NIMS/ICS Function
☐ Ensure the utility is prepared to receive and house external personnel or inform external responders they should be self-sufficient.	*Logistics*
☐ Develop a set of utility information materials that includes descriptions of facilities and processes as part of the utility Emergency Response Plan. This will aid emergency responders in the event of widespread loss of employees. The materials should include: system maps, site plan, and schematics, system capacities, and emergency resources (i.e., backup power supplies and redundant facilities).	*Operations, Planning*
☐ For each facility, draft a building plan including room layout, indicating the materials to be typically found in each room /area and include this in the Emergency Response Plan.	*Operations, Planning*
☐ Identify employees and key customers with special needs, and incorporate the requirements of these persons into the utility's preparedness plan.	*Planning*

Have a Contingency Plan for Accessing Additional Employees and Critical Supplies

Actions	NIMS/ICS Function
☐ Identify essential critical raw materials, suppliers, subcontractor services/products, and logistics required to maintain operations by location and function. Recognize that under certain events (pandemic, regional disaster, etc.) reliability of delivery of chemicals and other supplies may be locally curtailed. Planning should include indentifying distant suppliers.	*Operations, Planning*
☐ Consider utilizing retired employees to augment staffing. ☐ Work with Human Resources to establish appropriate policy and procedures for hiring retirees on a temporary basis. ☐ Develop a means to contact retirees. ☐ Consider establishing periodic training sessions for retirees who may be interested in augmenting staff during emergencies.	*Logistics*

Actions	NIMS/ICS Function
☐ Enter into WARN or other mutual aid assistance agreements to provide support as needed.	*Management*

Assist with Employee Preparedness so Employees Are Available in an Emergency

Actions	NIMS/ICS Function
☐ Take into consideration how hazards associated with the location of each utility facility might prevent employees from reaching facilities during an incident and address possible work-arounds in the emergency plan. Coordinate this effort with the local emergency management agency.	*Planning*
☐ Encourage employees to identify and use multiple alternate travel routes to and from reporting sites so they are prepared for primary route closures.	*Management, Logistics*
☐ Encourage employees to have personal emergency preparedness plans in order. Provide draft or model templates for their use.	*Management, Logistics*

Be Prepared to Support Employees at the Facility

Actions	NIMS/ICS Function
☐ Purchase, store, and maintain food and potable water at each facility. Food and bottled water are perishable, so be sure to create a rotation plan for foodstuffs and/or purchase foods with a long shelf life (e.g., MREs).	*Logistics*
☐ Purchase cots, blankets, pillows, etc. for each facility in case staff is required to remain on-site.	*Logistics*
☐ Have first-aid supplies available at all facilities.	*Logistics*
☐ Procure supplies/materials (food and potable water for staff and supplies such as cots, personal hygiene, etc.) necessary to support operations by reduced staff.	*Logistics*

Consider Specific Preparations for Pandemic Outbreaks

Actions	NIMS/ICS Function
☐ Implement guidelines to modify the frequency and type of face-to-face contact (e.g., hand-shaking, seating in meetings, office layout, shared workstations) among employees and between employees and customers if disruption is pandemic-related.	*Operations, Logistics*
☐ Establish policies for employee compensation and sick-leave absences unique to a pandemic (e.g., non-punitive, liberal leave), including policies describing when a	*Management*

Actions	NIMS/ICS Function
previously ill person is no longer infectious and can return to work after illness.	
☐ Establish policies for flexible worksite (e.g., telecommuting) and flexible work hours (e.g., staggered shifts).	*Management*
☐ Establish policies for preventing influenza spread at the worksite (e.g., promotion of respiratory hygiene/cough etiquette, and prompt exclusion of people with influenza symptoms).	*Management*
☐ Establish policies for employees who have been exposed to pandemic influenza, are suspected to be ill, or become ill at the worksite (e.g., infection control response, immediate mandatory sick leave).	*Management*
☐ Establish policies for restricting travel to affected geographic areas (consider both domestic and international sites), evacuating employees working in or near an affected area when an outbreak begins, and guidance for employees returning from affected areas.	*Management*

Response and Recovery Actions for Reduced Workforce Incidents

Actions	NIMS/ICS Function
☐ Notify emergency response and regulatory personnel that the facility is working under emergency staffing conditions.	*Management*
☐ Establish contact with the local emergency management agency for support and also contact mutual aid and assistance partners that may be able to provide staffing resources. Determine if a mutual aid/WARN request for resources from other response partners is necessary.	*Management*
☐ Establish a schedule for regular release of information to the public and news media about utility services.	*Management*
☐ Determine, if possible, why employees are unable to make it to work. A utility may be able to work with emergency responders to help critical employees get to work.	*Management*
☐ Determine and define needs for additional staff to run critical equipment.	*Operations*
☐ Remind staff to use their family emergency plans.	*Management*
☐ Determine short and long-term staffing needs.	*Operations, Planning*
☐ Develop a utility Action Plan to achieve the objectives outlined by management or incident command. For multi-agency incidents objectives should be developed in	*Planning*

Actions	NIMS/ICS Function
coordination with the local community action plan.	
☐ Assess response, record lessons learned, and update plans accordingly.	*Planning*
☐ Procure just-in-time training materials, procedures, etc. necessary to support operations by non-regular staff.	*Logistics*
☐ Coordinate implementation of mutual aid/WARN agreements as appropriate and per direction from utility EOC management.	*Logistics*
☐ Gather documentation on the location and nature of recovery work done by utility and emergency response staff.	*Finance*
☐ Document costs related to the workforce disruption (e.g., overtime, contract labor, food and potable water for staff, and supplies such as cots, personal hygiene supplies, etc.).	*Finance*
☐ Ensure non-regular staff has adequate purchasing authority to continue critical operations.	*Finance*

Additional Resources

There are numerous fact sheets and resources available to help the utility prepare for dealing with a reduced workforce. For more information, please refer to:

- ASIS International. *ASIS Disaster Preparation Guide*. 2003. <http://www.asisonline.org/newsroom/crisisResponse/disaster.pdf>
- California Office of Emergency Services. *Emergency Planning Guidance: Public and Private Water Utilities*. March 1999. <http://www.oes.ca.gov/Operational/OESHome.nsf/PDF/Emergency%20Planning%20Guidance%20for%20Public%20and%20Private%20Water%20Utilities/$file/H2o_.pdf>
- Centers for Disease Control and Prevention Website. <http://www.cdc.gov/>
- US EPA Office of Water. *Large Water System Emergency Response Plan Outline: Guidance to Assist Community Water Systems in Complying with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002*. US EPA, 810-F-03-007, July 2003. <http://www.epa.gov/safewater/watersecurity/pubs/erp-long-outline.pdf>
- Washington Department of Health. *Emergency Response Planning Guide for Public Drinking Water Systems*. DOH PUB. #331-211, May 2003. <http://www.doh.wa.gov/ehp/dw/security/331-211_5-13-03_Emergency_Response_Planning_Guide.pdf>
- Water Infrastructure Security Enhancements (WISE) Initiative. *Recovery Practices Primer for Natural Disasters*. September 2008. <www.asce.org/files/pdf/wise/6.pdf>

- US Department of Homeland Security. *Pandemic Influenza Preparedness, Response, and Recovery Guide for Critical Infrastructure and Key Resources*. <http://www.werf.org/AM/Template.cfm?Section=Home&Template=/CM/ContentDisplay.cfm&ContentID=11715>

Specific Actions for Contamination Incidents

A biological, chemical, or radiological contamination incident can disrupt a utility's ability to treat or deliver safe drinking water or treat and discharge wastewater. It is important that utilities prepare for contamination incidents by decreasing their vulnerability through surveillance and monitoring, ensuring access to redundant and back-up water supplies and wastewater treatment, and developing response and recovery plans. Actions taken prior to an incident have the potential to reduce risk, minimize the consequences of an incident, reduce vulnerability, and/or enhance response and recovery.

Utilities should incorporate the following actions specific to contamination incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document. Contamination incidents may also include a violation of water quality regulations and there may be other requirements states have to comply with to ensure water systems are compliant with the Safe Drinking Water Act.

Preparedness Actions for Contamination Incidents

Actions	NIMS/ICS Function
☐ Establish a monitoring and surveillance system for the early detection of a contamination incident.	*Management*
☐ Implement periodic source water and wastewater outfall water quality sampling and analytical procedures to detect possible contamination.	*Operations*
☐ Collaborate with county or local public health departments to collect and analyze public health data for illnesses that may be linked to drinking water contamination incidents or wastewater spills or backups.	*Management*
☐ Implement customer complaint surveillance procedures to identify unusual call volumes/spatial clustering that may be indicative of a possible contamination incident.	*Operations*
☐ Implement a stakeholder surveillance process to identify fish kills or other signs of contamination in the receiving water body or near the outfall.	*Operations*
☐ Identify and document lab sampling and analytical procedures as well as alternate methods of analysis if direct sampling is not possible.	*Operations*
☐ Develop a contamination-specific management plan which includes procedures for determining the credibility of a contamination threat and outlines potential response actions to take during the investigation process.	*Management, Operations, Planning*
☐ Develop a crisis communication plan to outline when and how to make internal and public notifications, including establishing delivery systems for the message.	*Management*

Actions	NIMS/ICS Function
☐ Establish procedures for characterizing the nature and extent of contamination in the system and procedures for determining the potential risk to human health if contamination is present.	*Operations, Planning*
☐ Evaluate and implement engineering and design changes that can be used during an incident to facilitate alternative water sources and treatment approaches.	*Planning*
☐ If needed, be prepared to provide alternate potable drinking water supplies and wastewater treatment facilities.	*Logistics*
☐ If needed, be prepared to discharge untreated or partially treated wastewater to the environment, including necessary coordination with regulatory and public health agencies.	*Operations*

Response and Recovery Actions for Contamination Incidents

Actions	NIMS/ICS Function
☐ Notify local emergency responders and emergency management organizations and officials.	*Management*
☐ Take steps to protect responders, staff, and the general population from further danger.	*Operations*
☐ Activate the utility's procedures for characterizing the nature and extent of contamination in the system and determining potential risks from any contamination present.	*Operations*
☐ Activate the utility's crisis communication plan.	*Management*
☐ Work with public health, local Office of Emergency Management, primacy agencies, and other partners to outline remediation alternatives and determine when the contamination has been successfully addressed and the water is safe to use.	*Management*

Additional Resources

There are numerous fact sheets and resources available to help utilities prepare for a contamination incident. For more information, please refer to:

- AWWA. *Selecting Disinfectants in a Security-Conscious Environment*. 2009. <http://apps.awwa.org/ebusmain/OnlineStore/ProductDetail/tabid/55/Default.aspx?ProductId=20745>
- NACWA. *Planning for Decontamination Wastewater*. 2005. <http://www.nacwa.org/images/stories/public/2005-10decon.pdf?phpMyAdmin=PM8UfvMmlxx8xqqtLrO9xEOmDg0>

- US EPA Office of Water. *Water Security Initiative: Interim Guidance on Developing Consequence Management Plans for Drinking Water Utilities*. EPA 817-R-08-001, October 2008. <http://www.epa.gov/safewater/watersecurity/pubs/guide_interim_cmp_wsi.pdf>

- US EPA Office of Water. *Water Security Initiative: Interim Guidance on Developing an Operational Strategy for Contamination Warning Systems*. EPA-817-R-08-002, September 2008. < http://www.epa.gov/safewater/watersecurity/pubs/guide_interim_operational_strategy_wsi.pdf>

- US EPA Office of Water. *Water Security Initiative: Interim Guidance on Planning for Contamination Warning System Deployment*. EPA-817-R-07- 005, May 2007. <http://www.epa.gov/safewater/watersecurity/pubs/guide_watersecurity_securityinitiative_interimplanningpdf.pdf >

- *Water Security Initiative: Cincinnati Pilot Post-Implementation System Status*. EPA-817-R-08-004, September 2008. <http://www.epa.gov/safewater/watersecurity/pubs/rpt_post_imp_system_status_wsi.pdf>

- US EPA Office of Ground Water and Drinking Water. *Response Protocol Toolbox: Planning for and Responding to Drinking Water Contamination Threats and Incidents*. Interim Final, April 2004. <http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module6.pdf>

- US EPA Office of Ground Water and Drinking Water. *A Water Security Handbook: Planning for and Responding to Drinking Water Contamination Threats and Incidents*. EPA, 817-B-06-001, April 2006. <http://www.epa.gov/safewater/watersecurity/pubs/water_security_handbook_rptb.pdf>

- US EPA National Homeland Security Research Center. *Effective Risk and Crisis Communication During Water Security Emergencies, Final 2007*. <http://www.epa.gov/nhsrc/pubs/600r07027.pdf>

- Water Infrastructure Security Enhancements (WISE) Initiative. *Recovery Practices Primer for Natural Disasters*. September 2008. <http://www.asce.org/files/pdf/wise/6.pdf>

Specific Actions for Economic Disruption Incidents

Economic disruption might occur on its own, for example through catastrophic market failure; but is more likely as a result of a natural disaster or other large-scale incident that disrupts economic activity in a state or region. During these circumstances a utility may be unable to access its billing or banking systems, experience electrical service or communication outages, or be unable to access its facilities. It is critical that utilities prepare for the potential of economic disruption so they can continue to operate effectively during an incident.

Utilities should incorporate the following actions specific to economic disruption incidents into their planning for hazard mitigation preparedness, and their emergency response and recovery planning. These actions supplement the all-hazard actions described earlier in this document.

Preparedness Actions for Economic Disruption Incidents

Actions	NIMS/ICS Function
☐ Establish policies to authorize expenditures during a response. This might include pre-authorizations of certain expenditures or establishing emergency accounts or contracts with suppliers or contractors.	*Management, Finance*
☐ Mark all emergency-related contracts and pre-authorizations clearly so staff can find them quickly and not confuse them with executed instruments.	*Finance*
☐ Document the utility's critical financial records and systems.	*Finance*
☐ Create a plan to access critical financial records and systems remotely so staff can continue to use them even if an emergency prevents access to utility facilities.	*Finance*
☐ Identify how to continue to receive payments and make payments to employees and vendors during an emergency, even if staff cannot access utility facilities.	*Finance*
☐ Create a mechanism to expedite financial and procurement decision-making during an emergency.	*Management*
☐ Establish a financial contingency plan so staff can continue to operate essential services and implement recovery activities if an emergency significantly disrupts revenue.	*Finance*
☐ Consider establishing a "rainy day fund" as part of a utility's business continuity plan.	*Management*
☐ Ensure the utility's accounting system is able to capture financial data in a way that provides accountability and supports potential cost recovery actions.	*Finance*
☐ Increase the amount of cash on hand to facilitate purchase of supplies/equipment during response.	*Finance*

Response and Recovery Actions for Economic Disruption Incidents

Actions	NIMS/ICS Function
☐ Activate pre-authorizations for response and recovery spending and/or emergency contracts as needed.	*Management, Finance*
☐ Determine if staff can access normal financial and accounting systems; activate remote/alternate systems if needed.	*Logistics*
☐ Consider increasing limits on employee credit cards to facilitate purchase of supplies/equipment during response.	*Finance*
☐ Assess long-term implications of the incident on utility revenue and implement financial contingency plans as needed.	*Finance*
☐ Maintain accurate financial records to support accountability and reimbursement/cost recovery claims.	*Finance*

Additional Resources

There are numerous fact sheets and resources available to help the utility prepare for an economic disruption. For more information, please refer to:

- American Water Works Association. *Economic Benefits of Forming and Participating in a Water/Wastewater Agency Response Network (WARN)*. September 2008. <http://www.awwa.org/files/WARN/Economic_Benefits_of_WARN_09192008.pdf>
- ASIS International. *ASIS Disaster Preparation Guide*. 2003. <http://www.asisonline.org/newsroom/crisisResponse/disaster.pdf>
- California Office of Emergency Services. *Emergency Planning Guidance: Public and Private Water Utilities*. March 1999. <http://www.oes.ca.gov/Operational/OESHome.nsf/PDF/Emergency%20Planning%20Guidance%20for%20Public%20and%20Private%20Water%20Utilities/$file/H2o_.pdf>
- *NFPA 1600: Standard on Disaster/Emergency Management and Business Continuity Programs, 2007 Edition*. <http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=1600>
- US EPA Office of Water. *Large Water System Emergency Response Plan Outline: Guidance to Assist Community Water Systems in Complying with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002*. US EPA, 810-F-03-007, July 2003. <http://www.epa.gov/safewater/watersecurity/pubs/erp-long-outline.pdf>
- US EPA Office of Water. *Water/Wastewater Agency Response Network (WARN) Operational Plan*. April 2009. <http://www.epa.gov/safewater/watersecurity/pubs/guide_warn_ttfacilitator.pdf>

- Washington Department of Health. *Emergency Response Planning Guide for Public Drinking Water Systems*. DOH PUB. #331-211, May 2003. <http://www.doh.wa.gov/ehp/dw/security/331-211_5-13-03_Emergency_Response_Planning_Guide.pdf>

- Water Infrastructure Security Enhancements (WISE) Initiative. *Recovery Practices Primer for Natural Disasters*. September 2008. <http://www.asce.org/files/pdf/wise/6.pdf>

Section V: Preparedness, Response, and Recovery in Real Life, an Example Scenario

The purpose of this scenario is twofold. The first purpose is to facilitate communication/dialogue between the utility and local emergency managers. The second purpose is to illustrate that by following the actions described in the All-Hazard CMP and through the Incident Command System, utilities will respond and recover more effectively to an incident.

Earthquake Scenario

At 4:57 pm on a weekday an earthquake strikes the area. U.S. Geological Survey (USGS) monitoring stations report that the earthquake registers 5.8 on the Richter scale and lasts for 21 seconds. Two sizeable aftershocks, measuring 4.7 and 4.5, take place in the first hour after the initial earthquake and more aftershocks with lessening severity are expected over the next 24-48 hours.

Shortly after the earthquake, emergency sirens can be heard all over the city. The media has begun streaming breaking news broadcasts across radio, TV, and the Internet nationwide. Initial reports indicate the earthquake has done serious damage to the area and it is feared that there will be numerous human casualties.

There is structural damage along two portions of the primary roadways that cross the city. Damage in the southeast quadrant of the city has blocked all traffic in and out of the city's main thoroughfare and heavy damage in the northeast section has caused gridlock in the business district. Municipal workers living outside of the affected area may not be able to get into the area for days. Power and phone lines are down and 60 percent of the city is without electricity and phone service, including cell coverage. There are numerous gas leaks and some have caused explosions and fires at locations across the city.

The Governor declares a state emergency and contacts FEMA to request a Federal Stafford Act Disaster Declaration immediately. The State Emergency Management Agency is organizing an initial damage assessment and has requested reports from each affected county. National Guard resources are being mobilized to provide emergency services.

The State's Emergency Management Agency is functional. The State Emergency Operations Center (EOC) is activated. Utility personnel and local responders are organizing according to NIMS and ICS. FEMA regional personnel are working with state emergency management.

Drinking water utilities experience significant challenges:

- The local water utility, which provides water to about 700,000 residents and up to 1.5 million workers per day, identifies severe leaks in two of the in-city concrete buried water storage reservoirs – localized flooding is likely, especially in basements and low-level structures. The in-city reservoirs contain finished drinking water; however the majority of the city will be without drinking water service and water pressure will be low in serviceable areas.

- Emergency response team personnel have been called in from the city's utility department. However, they are quickly overwhelmed by the magnitude of the emergency situation. Establishing contact with local emergency management and mutual aid to request additional qualified professionals and technicians proves difficult with limited phone lines and transportation routes.
- Residents with service are concerned about drinking water from the tap and there are complaints about discoloration and floating particles. Residents are exhausted, stressed, and worried about where they will find the information they need to ensure their safety.
- Distribution lines are damaged and will require repair and disinfection prior to returning to service. Proximity to sewer line breaks poses an extensive contamination concern. Locating some of these breaks may be delayed due to lack of or low water pressure.
- Sinkholes and large pools of water start to appear as a result of cracked and leaking distribution pipelines.

Wastewater utilities experience significant challenges:

- The treatment process has been disrupted due to major structural damage at the Southeast Treatment Plant. This plant handles about 80 percent of the city's wastewater, which is treated and ultimately discharged into the local waterway. Plant shutdown for repair may cause significant backup and raw sewage spills, or force the operators to bypass.
- Damaged pump stations and broken sewer lines throughout the city cause increasing health risks as raw sewage is released into unsecured areas and public transportation routes.
- The Rural Wastewater Treatment Plant loses power to automated treatment and pumping systems and is in need of additional generators and personnel to run plant operations manually.

The utility initiates a response by activating their Emergency Response Plan, establishing Incident Command Posts (ICPs) at sites seriously affected, and setting up the utility Emergency Operations Center (utility EOC) to coordinate utility ICPs. As part of activating the utility EOC, the utility EOC management representatives make contact and begin to coordinate with the local community Emergency Operations Center (community EOC) and overall emergency management and incident command. The utility plays two main roles in the response: it manages the direct effects of the incident on utility operations by directing utility response and recovery actions and also supports the overall local community EOC by coordinating the utility response with the overall local community EOC action plan objectives and priorities. Communication and coordination between the utility and the local community EOC is critical. Both the utility-level response and the overall community-level response are carried out using the National Incident Management System (NIMS) and Incident Command System (ICS) positions described below.

Command Staff Personnel and Roles

Positions and Roles

Incident Commander: The individual responsible for all field incident activities, including the development of strategies and tactics and the ordering and release of resources at the scene. ICs are located at Incident Command Posts established near an incident. The IC has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident

operations at the incident site. Most commonly, law or fire personnel assume this role when on scene. In this case, the utility has its own incident commander. ICs request support from their respective Emergency Operations Center.

Utility Incident Commander: At utility facilities, the utility may designate a utility Incident Commander at specific field sites to direct utility personnel and resources as needed to address the impacts of the incident on that facility. Until relieved by a person with more experience or jurisdictional responsibility (like law or fire), the utility IC has overall authority and responsibility for conducting incident operations at that site. The utility ICs request support from the utility Emergency Operations Center.

Utility EOC Management: The management of the utility is responsible to set policy, establish priorities across the utility, approve the course of action for successful accomplishment of set objectives, and manage or coordinate deployment of resources (particularly limited or scarce resources) to all utility Incident Command Posts. The utility EOC management group communicates and coordinates with the local community EOC. The utility EOC may establish each of the positions described below to manage jurisdiction-wide issues.

Local Community EOC Management: The management of the local community EOC is responsible to set policy, establish priorities across the affected jurisdiction (such as a city or county), and manage or coordinate deployment of resources (particularly scare or limited resources) to all established Incident Command Posts.

The local community EOC may establish each of the officer positions described below to manage jurisdiction wide issues:

Public Information Officer: Interfaces with the public and media and/or with other agencies with incident-related information requirements.

Liaison Officer: Responsible for coordinating with representatives from cooperating and assisting agencies or organizations.

Safety Officer: Responsible for monitoring operations and advising on all matters relating to operational safety, including the health and safety of emergency response personnel.

General Staff

Operations Section Chief: Responsible for developing and implementing strategies and tactics to carry out the incident objectives, coordinating field resources, and identifying needed personnel or resources.

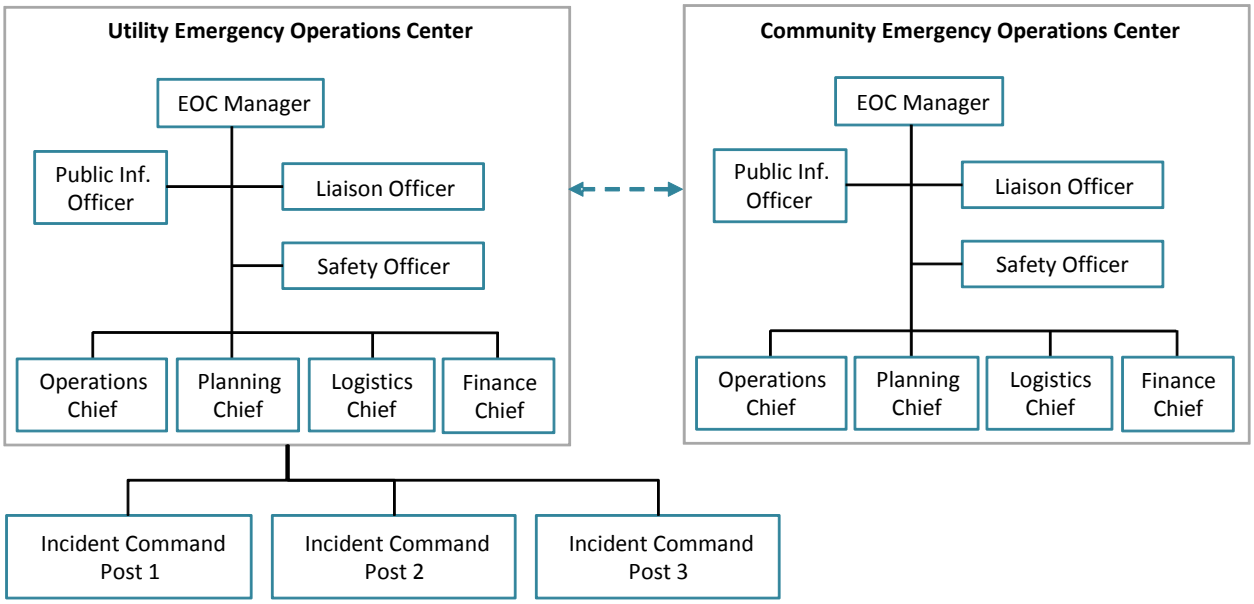
Planning Section Chief: Responsible for the collection, analysis, and dissemination of information and intelligence. Also responsible for managing the planning process, compiling an Action Plan and other related documents, and managing technical specialists.

Logistics Section Chief: Responsible for providing all facilities, transportation, communications, supplies, equipment maintenance and fueling, food, and medical services for incident personnel, and all off-incident resources.

Finance/Admin Section Chief: Responsible for financial and cost analysis. The Finance/Admin Section Chief oversees contract negotiations, tracks personnel and equipment time, processes claims for accidents and injuries, and works with Logistics to ensure resources are procured.

Incident Command Posts – Utility Emergency Operations Center – Community Emergency Operations Center

The Utility Emergency Operations Center oversees the Incident Command Posts at seriously affected sites and coordinates closely with the community Emergency Operations Center.



Details of Utility Response

Immediate Actions

Utility managers have previously prepared (and regularly updated) a plan that identifies the chain of command and line of succession during an emergency situation, as well as primary and alternate staff for key positions. Utility managers activate the Emergency Response Plan, confirm the chain of command based on available staff resources, and stand up the utility's Emergency Operations Center.[16] Using the ERP, utility managers identify risks to public safety and prepare necessary responses such as issuing "boil water" orders. The managers also activate the emergency staffing plan for key positions. The utility's EOC manager assumes responsibility for management of the utility EOC and, as the community water sector representative, prepares to coordinate actions with the community EOC. The Planning Chief completes the 201 Incident Briefing Form;[17] this will detail the utility's current command structure, documentation of resources, and summarize current actions. The completed form will become part of the permanent record of the utility's initial response to the earthquake.

[16] Coordination with local emergency management must be established.

[17] 201 Incident Briefing Form: http://www.training.fema.gov/emiweb/IS/ICSResource/assets/ics201.pdf.

Related Checklist Items

- *Establish a chain of command and line of succession plan so decision making authority is clear and responsibilities can be carried out confidently even if usual decision makers are not available. Regularly update the chain of command and line of succession and ensure that personnel in the line of succession know the circumstances under which they are responsible to assume command. (Management)*
- *Prepare procedures for drafting multiple transition staffing plans such as: initial responder relief, management of ongoing day-to-day operations, and managing longer-term recovery, and mitigation planning. In an incident of any complexity or size, the recovery effort may need dedicated staff. (Logistics)*
- *Identify primary and alternate staff for each key position and those responsible to respond to incidents, including primary and alternate assignments for each NIMS or ICS function (management, planning, operations, logistics, and finance). (Management)*
- *Activate the emergency response plan, chain of command, and staffing plans. (Management)*

Utility managers and operators have met regularly prior to the incident with the local community emergency management staff and responders, and all have completed training on NIMS and ICS, so they are familiar with the process by which the community emergency operations will be implemented, the protocol for activation of the community EOC, and the location of the EOC. Community emergency operations staff and local police and firefighters have updated copies of the utility's Emergency Response Plan and contact information on file. The utility's EOC manager dispatches a designated Utility Agency Representative to the local community EOC to report to the community Liaison Officer; among other roles, the Utility Agency Representative works with the local community EOC Liaison Officer and staff to identify and communicate with critical customers and sensitive subpopulations that may be impacted by the consequences the earthquake has had on the water utility. The utility Liaison Officer activates the utility incident notification flow chart and begins to contact key response partners. The utility's Planning Section Chief designates regular intervals for summary and status updates. These updates are contained in ICS Form 209 – Incident Status Summary.[18]

Related Checklist Items

- *Learn the emergency operations protocols and procedures that will be enacted by local emergency responders in your area during an incident and understand how the National Incident Management System (NIMS) and Incident Command System (ICS) are applied in the utility's jurisdiction. Ensure key managers and system operators complete ICS 100 and 200 training at a minimum. Information on training is available online at* http://training.fema.gov/*. (Management)*
- *Identify and build relationships with key response partners, especially local emergency managers. For example, the utility should know who is likely to assume the position of incident commander for high risk, high probability*

[18] ICS Form 209 - Incident Status Summary: http://www.training.fema.gov/emiweb/IS/ICSResource/assets/ics209.pdf.

incidents; how the local and utility Emergency Operations Center (EOC) will be activated; and what response actions the utility is likely to be called on to support as well as how local emergency responders and local EOC can support the utility. (Management)

- *The utility should supply copies of its emergency preparedness, response, and recovery plans and other key utility information to response partners, especially local fire departments, police departments, and the utility's local emergency management organization. Sensitive information should be safeguarded by response partners or, if not needed, scrubbed from plans provided to outside agencies. (Management)*
- *Establish an incident notification flow chart clearly identifying key staff and response partners to contact. Record contact information and update it frequently. (Planning)*
- *Identify and document contact information for critical customers and sensitive subpopulations. Critical customers and sensitive populations could include, but are not limited to, hospitals, fire stations, schools and universities, and group elderly housing /care facilities. (Planning)*
- *Send a utility agency representative to establish contact with the local community EOC to coordinate emergency management with regulatory agencies, technical resources and other infrastructure (e.g., power companies). In the case of a criminal incident, coordination with law enforcement will be required. In coordination with EOC staff, identify and communicate with critical customers and sensitive subpopulations. Communicate any suspected contamination to appropriate regulatory and public health officials. Use the utility's prepared list of contacts. (Management)*

Utility EOC Operations staff recognize that additional resources for risk assessment may be necessary. For example, structural engineers may be needed to determine the extent of the damage to the concrete buried water storage reservoirs and the wastewater treatment plant. Raw sewage releases and damaged water lines will necessitate the management and eventual disposal of contaminated water and materials for which additional expertise and resources may be needed.

Related Checklist Items

- *Determine if utility and local incident resources are adequate or if the utility needs to access additional resources such as more specialized resources for damage assessment, longer-term recovery, site characterization, and/or management and disposal of contaminated water, wastewater, and other materials. (Planning)*

Communications Disruption

Due to the disruption of hard line and cell phone service in much of the city, the utility EOC Staff activate available alternate communications systems including amateur and CB two-way radios, text messaging, and satellite phones. Through previous planning with local emergency management staff, the

community EOC has updated lists of the utility's backup radio frequencies and satellite phone numbers. Communications information also is recorded in ICS Form 205 – Incident Communications Plan.[19] Utility staff deploy laminated copies of emergency plans, which have been regularly updated and are located on site at all facilities.

Related Checklist Items

- *Establish backup communications networks to check on facilities that rely on telemetry or other systems to manage operational systems and to communicate with utility incident command staff, partner utilities, primacy agencies and response partners if normal lines of communication are down. (Logistics)*
- *Provide key utility management and staff with radios or other alternate means of communication so they can contact key facilities during an incident even if normal communication lines are down and they cannot go to the facility in person (e.g., because roads are impassable). (Logistics)*
- *Activate alternate communications systems. (Management)*

Development of Utility Action Plan

Utility Planning Section staff create a utility Action Plan that includes a rapid assessment of damage to water and wastewater facilities as a result of the earthquake. Utility Planning staff assess the services that the utility is able to deliver and report this information to the utility EOC Management. Utility Planning staff coordinate closely with utility Operations staff to determine priority for damage repairs, amount of time needed for repairs, and staff capabilities for making such repairs.

Related Checklist Items

- *Catalog and prioritize all utility control systems. Determine which control systems should be restored first in an emergency. (Operations)*
- *Create a utility Action Plan based on incident objectives provided by management or incident command and, in the case of multi-agency incidents, in coordination with the overall action plan established by the local community EOC. (Planning)*
- *Activate utility damage assessment procedures and document (Planning):*
  - *What is damaged and how,*
  - *What services the utility can still safely deliver,*
  - *What is needed to recover minimal service,*
  - *What is needed to restore to full service,*
  - *How long these different stages of recovery will take, and*
  - *Access emergency/backup data, maps and systems as needed.*

[19] ICS Form 205 - Incident Communication Plan: http://www.training.fema.gov/emiweb/IS/ICSResource/assets/ics205.pdf.

Plans to address the reports of fires within the city, the possible compromise of drinking water supplies, and the possible failure of wastewater treatment services are included in the utility's Action Plan. The utility EOC Management staff coordinate with the local community EOC to determine where alternative water service for fire suppression is most needed. Utility Operations staff identify areas of the city where drinking water quality has been compromised and begin mobilization of alternative or bottled water distribution to those areas. Because of damage to the wastewater treatment infrastructure, Utility Operations staff implement plans for alternative wastewater treatment services.

Related Checklist Items

- *Carry out actions according to the utility Action Plan. This may include actions to provide alternative water service for fire suppression, alternative or bottled water for consumption, and alternative wastewater treatment options. (Operations)*

Mutual Aid System Activation

Utility EOC management quickly review internal protocols and determine that the consequences of the earthquake warrant WARN or other mutual aid system activation. Utility EOC Management staff complete the WARN Emergency Notification Form and the WARN Request and Authorization Form and designate a utility WARN Liaison Officer to coordinate with incoming resources. Copies of the WARN Emergency Notification Form and Request and Authorization Form are available in the WARN Operational Plan.[20] Utility Operations staff create a prioritized list of actions to be taken as additional human and material resources become available. Utility EOC Management identifies a mutual aid coordinator to be sure receipt and acceptance of incoming mutual aid is coordinated and integrated with utility resources and provided appropriate care.

Related Checklist Items

- *Develop an internal protocol for when to activate WARN, other mutual aid arrangements, and emergency contractors. Also consider what procedures need to be in place at each utility facility to provide aid to another utility through the WARN system or other mutual aid agreements. (Management)*
- *Ensure the utility is prepared to receive equipment and/or personnel support during an incident, for example, through appropriate site preparation, equipment interoperability procedures and start-up /shut-down checklists. (Logistics)*
- *As part of the Action Plan, establish work priorities for incoming mutual aid resources as appropriate. (Planning)*

[20] US EPA. WARN Operational Plan. Draft February 2009. <http://www.awwa.org/files/WARN/DRAFT%20WARN%20Operational%20Plan.pdf>

Staffing Plans

Utility Logistics staff recognize that as the consequences of the earthquake continue to unfold, staff members employed in emergency relief efforts will become physically and emotionally fatigued. Logistics staff implement a transition staffing plan to ensure that utility personnel receive sufficient relief. The Utility Safety Officer works closely with utility Logistics staff on staffing plans and reports to the utility EOC Management on the health and safety of utility personnel engaged in emergency response efforts. The utility Planning staff develop a staffing plan for maintaining daily operations combined with recovery efforts, which will require additional personnel. Utility managers remind employees to follow their personal emergency preparedness plans and protocols to support the safety of their families during the emergency and assist employees in receiving updates on their family.

Related Checklist Items

- *Encourage employees to have personal emergency preparedness plans in order and establish protocols to help employees working in an emergency check on the safety of their families. This may include providing model family emergency plans for employees to use. (Management)*
- *Implement a transition staffing plan for: staff relief, return to work, maintaining day to day operations and recovery. (Logistics)*

The disruption of transportation places extra burden on staffing capacity and ability to allocate human resources to critical areas. The utility Operations staff issue an emergency request for any available staff to report to their supervisors for duty assignments. Assessments reveal that the utility has approximately 80% of normal staffing capacity available. Of the available staff, 40% have damage to their home.

Related Checklist Items

- *Identify staffing capabilities and shortages. Request staffing support and update the staffing plan as necessary. (Operations)*
- *Establish protocols and procedures to help employees ensure the safety of their families during an emergency. (Logistics)*
- *Notify family members of the status of employees on duty, as appropriate. (Logistics)*

During a recent pre-disaster planning exercise the utility developed a system for maintaining stocks of food, water, and disaster response kits at each of its facilities. Utility Logistics staff and the mutual aid coordinator identify locations where utility staff and mutual aid crews can access these supplies, rest, and receive meals. Utility Logistics staff also provide mutual aid crews with the locations and material contents of caches.

Related Checklist Items

- *Identify key utility information and vital records including descriptions of the system, electronic and hard copy maps, as-built drawings, deeds, site plans, and schematics with GPS locations of key infrastructure, system capabilities, and emergency resources such as backup power supplies, and redundant facilities. (Planning)*
- *Maintain food, potable water, first-aid, and other emergency supplies at all facilities where personnel work. (Logistics)*
- *Coordinate feeding, lodging, and maintenance support for mutual aid crews. (Logistics)*

Financial Operations

Utility Finance staff activate emergency policies for authorization of expenditures and emergency contracts with suppliers and contractors. Contracts and pre-authorizations are made available to field employees engaged in response. Finance staff gather information on response costs, including tracking personnel time and material resources used, for eventual reimbursement claims through insurance and state/federal disaster assistance programs.

Related Checklist Items

- *Establish policies to authorize expenditures for supplies and other necessary equipment during a response. This might include pre-authorizations of certain expenditures or establishing emergency accounts or contracts with suppliers or contractors. Mark all emergency-related contracts and pre-authorizations clearly so staff can find them quickly. (Management, Finance)*
- *Establish a protocol to increase the amount of cash the utility has on hand during an incident and increase limits on employee credit cards (if applicable) to facilitate purchase of supplies/equipment during response. (Finance)*
- *Understand the protocols and requirements for cost reimbursement through insurance, WARN or other mutual aid agreements, and state disaster assistance programs. Ensure the utility knows what records and information will be needed to support reimbursement claims. Prepare electronic collection forms as needed to gather cost and time documentation. (Finance)*
- *Understand the utility's own insurance deductible, coverage, and obligations. (Finance)*
- *Incorporate collection of cost reimbursement information (including receipts and time sheets) into the utility's response and recovery protocols. (Finance)*
- *Access emergency funds, including cash, as needed. (Finance)*
- *Document response/remediation actions and expenditures for reimbursement. (Finance)*

Utility Operations staff report and utility Finance staff maintain a detailed record of response and remediation actions, not only for reimbursement but also for after-action analysis.

Damaged Distribution and Collection Systems

Utility Operations staff implement pre-established protocols for collecting and managing incident information. The utility deploys available sampling and engineering teams to damaged distribution and collection lines to assess wastewater and water system contamination. Sample data is collected by the utility and is made available to the utility EOC Management. The utility's Planning Section Chief prepares field assignments and informs Operations staff of their assignments using ICS Form 204.[21]

[21] ICS Form 204 - Assignment List: http://www.training.fema.gov/emiweb/IS/ICSResource/assets/ics204.pdf.

Related Checklist Items

- *Establish protocols to collect and manage incident information, such as sampling and analysis results and incident status reports, and ensure the utility can make this information available to the incident commander, other incident response managers, local community EOC, and utility management if needed. (Operations, Planning)*
- *Activate the utility's procedures for characterizing the nature and extent of contamination in the system and determining potential risks from any contamination present. (Operations)*

Based on the findings of the contamination assessment, the utility begins repair operations and coordinates with city/county public health officials to minimize risks to the public. The utility Safety Officer monitors conditions on the ground to ensure that utility personnel are not put in harm's way.

Related Checklist Items

- *Work with public health, local Office of Emergency Management, primacy agencies and other partners to outline remediation alternatives and determine when the contamination has been successfully addressed and the water is safe to use. (Management)*

Due to the risk from contaminated water supplies and raw sewage releases, the utility Public Information Officer notifies the public of potential hazards through the community Joint Information Center (JIC) and the utility Liaison Officer notifies the appropriate regulatory agencies. The disruption of communications capabilities in the city raises the importance of using existing public emergency notification channels to inform of potential risks to drinking water and wastewater treatment.

Related Checklist Items

- *Establish procedures for providing the public with information as required by state primacy agencies and necessary under the Public Notification Rule.[22] (Management)*
- *Provide clear communication with the public and with the local community EOC when initiating and rescinding water advisories. Ensure these notifications meet federal and state requirements. (Management)*

Loss of Power

Due to the loss of power and communications in much of the city, utility Operations and Planning staff implement the previously developed plan for maintaining minimum independent operations for 72 hours. Utility Operations staff switch to manual operations due to the failure of automated systems at the wastewater treatment and pumping plant.

[22] US EPA. National Primary Drinking Water Regulations: Public Notification Rule. 4 May 2000. State primacy agencies may have alternate or more detailed requirements. <http://www.epa.gov/ogwdw/dwa/course-npdwr.html>

Related Checklist Items

- *Identify the minimum resources (including personnel) the utility needs to maintain minimum operations and essential services and also identify how long the utility can maintain those operations/services without outside help. The utility should be able to maintain operations/services on its own for at least 72 hours. (Operations, Planning)*
- *Identify key interdependencies with other sectors such as power generation, telecommunications, and chemical suppliers; consider how the utility would maintain minimum services and essential operations if another sector were to be out of service during an incident. (Operations, Planning)*
- *Switch to manual operations as needed. (Operations)*
- *Implement backup SCADA system or shift to manual control. (Operations)*

Utility Operations staff assess the ability of emergency generators to handle power requirements for critical systems that are still operational, taking into account the quantity of fuel available to run the generators and estimates of the length of power outage from the city's power utility. Utility Operations staff deploy available power generators to the Rural Wastewater Treatment Plant and other locations around the city as needed, in response to loss of power.

Related Checklist Items

- *Initiate back up power supplies to maintain utility operations, if possible. (Operations)*
- *Take actions necessary to respond to the outage and repair the problem; this likely will involve coordination with the electrical service company. Determine if utility resources are adequate to respond to the loss of power or if assistance is needed. (Operations)*

Utility Operations staff establish and implement a plan to provide fuel for the generators. The utility establishes the quantity of accessible fuel in reserve and calculates the length of time that the generators will be able to operate, given this amount. The utility also coordinates with the local community EOC to determine other fuel reserves that could be made available to supply the generators. Based on this information, the utility devises a priority scheme for fuel distribution. Utility operations engineers assess any damage to equipment caused by the loss of power.

Related Checklist Items

- *Establish fueling plan to support generators. (Planning, Logistics)*
- *Repair equipment that may have been damaged by the loss of power. (Logistics)*

Structural Damage to Sewage Treatment Plan

Due to the structural damage at the Southeast Treatment Plant, utility Operations staff develop a bypass plan for implementation during repairs to the plant. The bypass plan is coordinated through the utility Liaison Officer with the community public health agency and other key parties to ensure minimal risks to human health

Related Checklist Item

- *For wastewater utilities determine the best methodology and location to bypass overflows due to equipment malfunction and/or power outages. (Operations, Planning)*

and the environment. The utility Safety Officer confirms, following ICS 215a – Action Plan Safety Analysis,[23] that emergency personnel can enter the treatment plant and begin response and recovery operations.

Demobilization of Resources & Reimbursement

The magnitude of the earthquake and ensuing damage require a significant mobilization of resources for emergency response and recovery. Utility Planning staff create (or activate) a detailed plan for demobilizing these resources in an organized manner.

Related Checklist Items

- *Create a Demobilization Plan when appropriate. This plan should include the process to demobilize initial response resources including those provided through mutual aid arrangements and alternative water supplies or bypasses as appropriate. (Planning)*

Several weeks after the earthquake, daily operations at the utility stabilize and recovery efforts continue. Additional human and material resources that were accessed in the immediate aftermath of the earthquake are demobilized, and utility Planning staff begin an assessment of the response process. Utility managers complete post-incident reports, critiques, and evaluations. All WARN members involved in the response to the earthquake convene to complete an After Action Report and an Improvement Plan.

Related Checklist Items

- *Establish protocols for post-incident assessments including lessons learned and steps to take to prevent recurrence or reduce impacts and document successes. Prepare a list of questions to ask during after action reviews and draft outlines of what to include in an After Action Report. Please see the FEMA HSEEP website at: https://hseep.dhs.gov/pages/1001_HSEEP7.aspx for more information.[24] (Planning)*
- *Upon demobilization, evaluate lessons learned, identify steps to take to prevent recurrence or lesson impacts, and document successes. (Planning)*

Utility Finance staff begin the reimbursement process to recoup utility response and recovery expenses and file the appropriate claims with the utility's insurance carrier. Copies of personnel and material tracking forms from throughout the incident are sent to the finance staff for this purpose.

Related Checklist Items

- *Use forms and formulas required to document costs of incident response for state, federal, and insurance reimbursements. (Finance)*
- *Notify insurance carrier and file appropriate claims. (Finance)*

[23] ICS Form 215a - Action Plan Safely Analysis: http://www.training.fema.gov/emiweb/IS/ICSResource/assets/ics215a.pdf.

[24] US DHS. FEMA Homeland Security Exercise and Evaluation Program. <https://hseep.dhs.gov/pages/1001_HSEEP7.aspx>

Summary of Utility Response

A combined wastewater/drinking water utility has used the checklists in the All-Hazards CMP to organize its existing preparedness, response, and recovery plans and protocols. Its preparedness is put to the test when an earthquake strikes, damaging utility infrastructure and disrupting power and communications throughout much of the city. The utility commences emergency operations and activates its emergency management plans, including its plans for emergency staffing, communications, safety, and integration with local emergency responders. The checklists have helped the utility prepare by providing instructions on the roles and responsibilities of Management, Operations, Finance, and Logistics staff.

As the extent of the damage caused by the earthquake is assessed, utility Planning Section staff craft an Action Plan. The Action Plan details the utility's response and recovery operations, including repairing damaged distribution and collection systems and structural damage to the sewage treatment plant. As specified in the checklists, these operations are carried out according to a combination of prioritized needs and available human and material resources, including mutual aid resources. Simultaneously, utility Finance staff and Logistics staff carry out their roles in response and recovery, reinforced by previous planning, and refined through the checklists. Finance staff provide emergency access to funding and contract vehicles, while tracking operations for reimbursement purposes. Logistics staff provide support both for utility personnel and mutual aid crews. The utility's Emergency Operations Center continuously coordinates its actions with the Community Emergency Operations Center through a designated local Community Liaison Officer. The consequence-specific checklists have also helped the utility prepare for the loss of primary communication tools and power supplies, and the utility implements contingency plans to deal with both of these circumstances.

After a short but intense period of emergency operations, the utility begins to stabilize its normal daily functions and turns toward longer term recovery. As indicated in the checklists and incorporated into response and recovery plans, the utility continues recovery operations while demobilizing excess resources. After operations have returned to stable condition, the utility staff begin the process of conducting an after-action assessment, using the detailed action record as a primary source of information. This assessment is undertaken both internally and in coordination with other agencies involved in the incident response. The after action assessment includes lessons learned that the utility uses to improve its preparedness plans for future incidents.

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